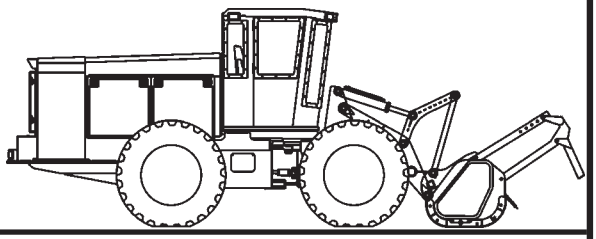
BARKO 930-937 MULCHER



SERVICE MANUAL

930-937 Mulcher

Machine
Serial Number _____

NOTE: The operating and safety instructions for a Attachment are not included in this manual. See separate Attachment manual.

The information and illustrations in this manual have been approved as accurate at the time of printing. However, the manual may contain information on options not present on your loader. The right is reserved by Barko Hydraulics,LLC to make changes and improvements in its product at any time without notice or obligation.

BARKO HYDRAULICS, LLC

1 BANKS AVENUE, SUPERIOR, WI 54880
phone: 715-392-5641 • fax: 715-392-3931
website: www.barko.com • email: barkohydraulics@barko.com

060611

OPERATORS: 800-00256 PARTS: 800-00257 SERVICE: 800-00258

TABLE OF CONTENTS

INTRODUCTION 3
- Introduction 4
- Abbreviations and Symbols 5
- Warranty 7
- Know Your Machine 8
- Safety Summary 9
- Fire Prevention 14
- Model Description 15

MAINTENANCE 16

A. PREVENTIVE MAINTENANCE 16
- Safety While Servicing 17
- Preventive Maintenance 18
- Special New-Machine Instructions 18
- Service Schedule 19
- Tires 22
- Lubrication Points 23
- Fluid Specifications 25
- Special Torque Specifications 27
- General Torque Specifications 28

B. HYDRAULIC SYSTEM 29
- Hydraulic Hose Hookup 30

930 (NO FLOAT) 31
- Hydraulic Schematic 31
- Hydraulic Assembly 32
  - Rear Frame 32
  - Front Frame 33

937 (NO FLOAT) 34
- Hydraulic Schematic 34
- Hydraulic Assembly 35
  - Rear Frame 35
  - Front Frame 36
- Pressure Settings (mulcher machines) 37
- Pump Layout 38
- Rexroth Accessory Pump 39
- Differential Lock/Servo Valve 40
- Mulcher Pump 41
- Rexroth Drive Pump 43
- Sauer Drive Pump 44
- Rexroth Drive Motor 45
- Sauer Drive Motor 46
- Hydraulic Hose Hookup (mulcher) 47
- Hydraulic Reservoir Maintenance 48
- Hydraulic Oil Filter Maintenance 50
- Eliminating Air From the Sytem 52
- Hydraulic Fittings, Hoses and Tubing 53
- Hydraulic Cylinder Maintenance 54
- Axle Maintenance (John Deere) 56

C. ELECTRICAL SYSTEM 58
- Electrical Schematic (Cummins) 59
- Electrical Schematic (JohnDeere) 61
  - Heater-Air Conditioner Electrical Schematic 63
- Electrical System Maintenance 65
  - Electrical System Description 65
  - Electrical System Inspection 65
  - Using an Extra Battery to Start Machine 65
  - Installing a New Battery 66
  - Alternator Drive Belt Adjustment 67
  - Alternator Maintenance 67
  - Electrical System Trouble Shooting 69
- Air Conditioner Maintenance 70
  - Air Conditioner System Layout 70
  - Refrigerant 71
  - Checking/Adding Refrigerant 72
  - Running the Unit as Preventive Maintenance 72
  - Fresh-Air Intake Filter 72
  - Fresh-Air Intake Filter Cleanout Fan (mulchers) 72
  - Receiver/Dryer Installation 72
  - Condenser Installation 72
  - Air Conditioner Trouble Shooting 73

D. POWER UNIT MAINTENANCE 81
- Engine Maintenance 82
- Pump Drive Maintenance 83
  - A. Two, Three and Four Pad Pump Drives 83
  - B. Single Pad Pump Drives 86
  - C. Optional Disconnect Clutch 86
- Air Cleaner Maintenance 87

MACHINE PHOTOS 91

DECALS 92

Introduction

INTRODUCTION

Your Barko Mulcher has been designed and manufactured with high quality materials and care in workmanship. This manual is intended as a permanent reference to aid professional operator's in their work, and should be available for use at any time. If the machine is not equipped with this manual, ask your supervisor to obtain one for you.

Understand the correct servicing procedures before servicing the machine. It is important to know the correct operating and servicing procedures of the Mulcher and all safety precautions to prevent the possibility of property damage and/or personal injury or death.

As a professional, trained operator, you are responsible for safety, both your own and that of your co-workers. Your knowledge and use of all safety practices and correct servicing procedures in this manual, and your good judgement, can be a major factor in preventing some of the thousands of injuries and deaths caused by industrial accidents each year.

A professional operator should also be familiar with the information contained in other applicable sources such as American National Standards, SAE, OSHA, etc.

ADDITIONAL INFORMATION:
Logging Safety Resource Guide (APA, 95-A-1) is available from the American Pulpwood Association. This guide lists sources of videotapes, slide programs, movies, and publications on various aspects of logging safety.

DON'T FORGET - SAFETY FIRST!

INFORMATION

All requests for information, service or spare parts should include loader serial number. For more information contact:

Barko Hydraulics,LLC
One Banks Avenue
Duluth, MN 55816

Phone: 715-392-5641
Fax: 715-392-3931

Website: www.barko.com
Email: barkohydraulics@barko.com

REFERENCE

The Mulcher serial number plate is located on the front frame assembly.

930-937 Mulcher
Model No. _____

Serial No. _____

Engine
Model No. _____

Serial No. _____

NOTE: Information in this manual is current at the time of printing. Barko Hydraulics reserves the right to make changes and improvements to it's products and manuals at any time without notice or obligation.

ABBREVIATIONS AND SYMBOLS

a/c	=	air conditioner
AC	=	Articulated Carrier (Art. Car.)
adj.	=	adjust or adjusting
appl.	=	application
AR	=	As Required
assy	=	assembly
BC	=	Back of Cab
b/m	=	bill of material
brg.	=	bearing
CAR	=	Carrier
coll.	=	collector
cond.	=	conditioner
CRL	=	Crawler
cyl.	=	cylinder
dia.	=	diameter
dwg.	=	drawing
Ft. Lbs.	=	Foot Pounds
gal.	=	gallon
HRT	=	Hydrostatic Rough Terrain carrier
ill. or illus.	=	illustration
In. Lbs.	=	Inch Pounds
incl.	=	includes or including
j.s.	=	joystick
Lbs.	=	pounds
LH (lh)	=	left hand
mtg.	=	mounting
N/A	=	Not Applicable
no.	=	number
NSS	=	Not Sold Separately
opt.	=	optional
pg.	=	page
qt.	=	quart
RH (rh)	=	right hand
sec.	=	secondary
see sep. ill.	=	see separate illustration (means: located elsewhere in manual)
SE	=	Stationary Electric
SER or SR	=	Stationary Electric Remote
s/n	=	serial number
str.	=	straight
swhd	=	saw head
TM	=	Truck Mount
w/	=	with

EXPLANATIONS OF OTHER OCCURRENCES IN THIS MANUAL:

- In a parts list, when there are item numbers with empty spaces (no description or part number), these parts have been previously deleted from that parts list and are not recorded anywhere.

- In a parts list, when there are items with no part number and a dotted line (----) is in the part number space, this means that the part number is not sold separately or is not available at this time.

- When references to "right hand" or "left hand" are used in this manual, it is done from the operator's seat in the forward operating position.

SYMBOLS USED ON MACHINE

Ignition Key Switch

Power On (Accessory)

Power Off

Power On

Horn

Starter

Engine RPM

Faster

Slower

Air Conditioner

WARNING

Raising hydraulic pressure on this machine above the factory approved settings may cause death, severe injury or property damage and will void the warranty.

The consequences of increasing hydraulic pressure are serious. The function of the relief valves is to provide a fuse action to protect the machine and the operator from overloading. When overloaded, the machine can become stressed to a level where parts fracture causing death, severe injury or property damage. **This is an extremely dangerous practice.**

Accordingly, you are advised that the pressure settings of this machine are limited to the factory approved settings. Pressures in excess of these settings render each and all Barko warranties null and void and constitute an obvious misuse and abuse of our product.

BARKO HYDRAULICS, LLC

WARRANTY

BARKO HYDRAULICS, LLC

BARKO HYDRAULICS, L.L.C. ("Barko") warrants to the Distributor and/or original Buyer each new hydraulic knuckle boom loader, feller buncher, Mulcher or other product in BARKO HYDRAULICS Equipment Group including attachments and accessories thereto, ("Product") sold by BARKO to be free from defects in material and workmanship under normal use, maintenance and service.

BARKO will cause any major structural component of a BARKO product covered by this warranty which proves to be defective in material or workmanship under normal use, maintenance and service within three (3) years) or 6,000 hours, whichever occurs first from first day in service, provided first day in service is not later than one (1) year from delivery to Distributor and/or original Buyer or other user, to be replaced without charge with a new or repaired part, at BARKO election. BARKO also will cause the labor to remove any such defective part and to install the new or repaired part to be provided without charge to the owner of said BARKO product. The parts and labor to meet this warranty will be furnished by designated BARKO distributor.

BARKO will cause all other parts of product covered by this warranty which proves to be defective in material or workmanship under normal use, maintenance and service within one (1) year or 2,000 hours, whichever occurs first from first day in service, provided first day in service is not later than one (1) year from delivery to Distributor and/or original Buyer or other user, to be replaced, without charge, with a new or repaired part, at BARKO election. BARKO also will cause the labor to remove any such defective part and to install the new or repaired part to be provided without charge to the owner of said BARKO product. The parts and labor to meet this warranty will be furnished by BARKO designated distributor.

BARKO warrants all service parts purchased from BARKO and used on a BARKO manufactured unit, to be free from defects in material and workmanship under normal use, maintenance and service for a period of six (6) months or 1,000 hours, whichever occurs first. BARKO will cause any such part which proves to be defective to be replaced with a new or repaired part at BARKO election on a parts only basis.

Proof of any defect must be submitted to BARKO within ten (10) days from the date on which the defect was discovered and any claim submitted within thirty (30) days after repair work is completed.

BARKO warranty does not cover:

1 Defects, damage or deterioration due to normal use, wear, tear, exposure, storage or corrosion.
2. Normal maintenance service, including replacement of filters, oil, seals and the like.
3. Damage due to failure to maintain or use the BARKO product or part according to manuals, schedules or good practice.
4. Damage caused by abuse of equipment or parts by overloading, misapplication, improper operation or use, installation of unapproved accessories or unauthorized alterations.
5. Damage resulting from repairs made in an unauthorized manner or installation of components not authorized by BARKO.
6. The labor to remove and reinstall a defective replacement part after the expiration of the warranty period applicable to the product in which part is located.
7. Overtime labor premiums.
8. Transportation of the BARKO product to the distributor's service facility or transportation of the distributor's serviceman to the product's location.
9. Vendor components not manufactured by BARKO, such as engines, transmissions and components, Tires, batteries or other parts normally warrantied and serviced by the manufacturer. The warranty of the respective manufacturers of these components shall apply.

The Buyer accepts this warranty and the limitations and disclaimers set forth herein as part of the purchase of the BARKO product or part to which this warranty applies.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, STATUTORY, WRITTEN OR ORAL, AND THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Remedies available to any person claiming under this warranty are exclusive and expressly limited to obtaining the parts and the labor, where applicable, in accordance with terms of this warranty.

BARKO liability for losses, damages or expenses of any kind arising from the design, manufacture or sale of the product covered by this warranty, whether based on warranty, negligence, contract, tort or otherwise, is limited to an amount not exceeding the cost of correcting the defects as herein provided, and, at the expiration of the applicable warranty period, all such liability shall terminate.

BARKO shall in no event be liable for incidental, consequential or special damages to losses of use of the BARKO product, a loss or damage to property other than the BARKO product, a loss of profits or other commercial loss, or any special or consequential damages (except liability for consequential damages which by law may not be disclaimed).

Revised 2/98

KNOW YOUR MACHINE

The following is a list of ten important safety precautions and warnings you should read through and understand before operating your machine.

1. **Don't assume that because you know the control functions of other similar machinery, that you can run the Barko Mulcher. All machines differ in some ways, and these differences must be noted and acknowledged. Read this manual thoroughly and understand all operating and safety procedures before operating the machine.**

2. **Know how to put your machine in a zero energy state for purposes of inspection, maintenance, or repair.**

3. **Clear operating area of all obstacles and personnel before operating machine.**

4. **Never approach power lines with any part of the machine. Current in a high voltage power line may arc some distance to jump from the wire to a nearby "ground". KEEP WELL CLEAR!**

5. **Never use the mulcher attachment or any other part of the machine as a work platform or personnel carrier. Serious injury or death may result.**

6. **Allow only the operator on the machine. Keep riders off. Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine. Riders also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.**

7. **When machine is not operating or before leaving cab, shut down machine and lower mulcher attachment to the ground. Failure to do so may allow mulching attachment to move or fall, causing property damage, injury or death.**

8. **Do not allow personnel under raised lift arms or head for any reason unless lift arms are supported so that they cannot fall in any way.**

9. **Do not tamper with any hydraulic line while it is pressurized. Escaping fluid under pressure can penetrate the skin, causing serious injury. Relieve pressure before unhooking hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard to search for leaks.**

   If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

10. **Replace any safety decals that are faded, torn, missing, illegible, or otherwise damaged. See your machine's Parts Manual for decal kits applicable to your machine and for locations of all decals.**

Don't stop here - read on.

SAFETY SUMMARY

Failure to follow safety precautions in this manual can result in death, severe personal injury and/or property damage. Carefully read safety precautions below and within this manual. Heed all decals on machine.

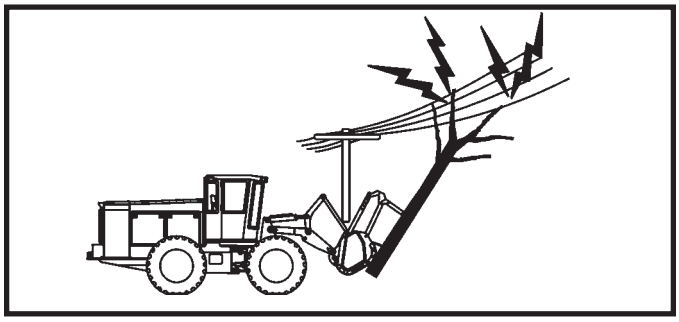
DANGER - Indicates an immediate hazard which WILL result in severe personal injury or death.

WARNING - Indicates a hazard or unsafe practice which COULD result in severe personal injury or death.

CAUTION - Indicates a hazard or unsafe practice which could result in minor personal injury or property damage.

DANGER

Never approach power lines with any part of the machine. Current in a high voltage line may arc some distance to jump from the wire to a nearby "ground". KEEP WELL CLEAR!



DANGER

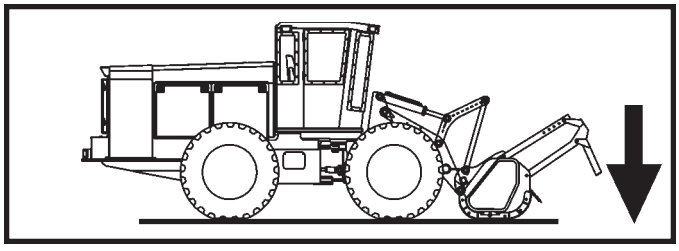
Do not operate machine during electrical storms.

WARNING

Keep all personnel back 300 feet from machine when operating. Flying debris can cause death or severe injury.

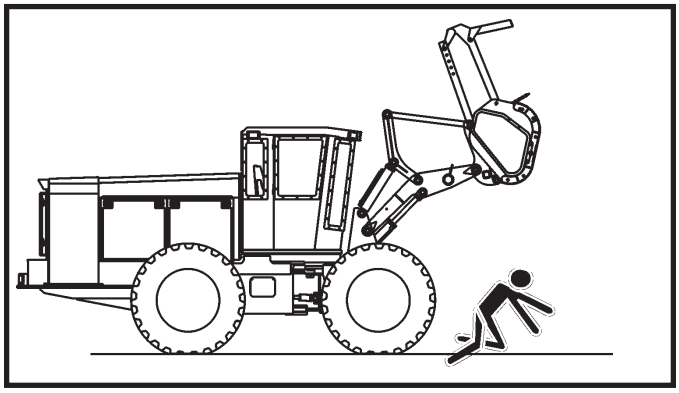
WARNING

Always lower the attachment to the ground and shut down machine before leaving cab.



DANGER

Do not allow personnel under raised head for any reason unless head is supported so that they cannot fall in any way.



WARNING

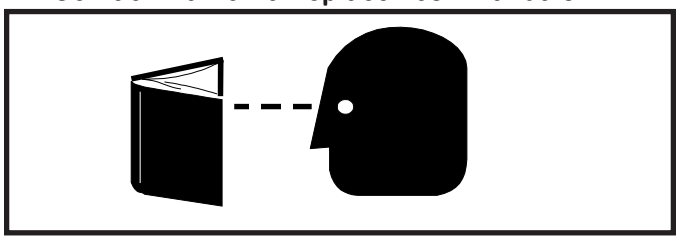
Clear all persons and obstacles from area of operation and machine movement. Do not move attachment over personnel.

WARNING

Know the prohibited uses or work areas for the machine and the hand signals used on the job.

⚠ WARNING

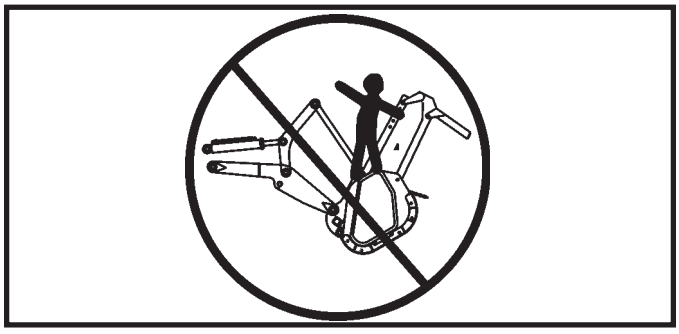
Do not operate or work on machine until you:
- Read and understand machine manuals, safety decals, employer work rules, and applicable government regulations.
- Are trained and qualified in safe machine operation and maintenance.
- Consult supervisor to explain any unclear instructions and warnings.
- Contact Barko to replace lost manuals.



⚠ WARNING

Allow only operator on machine. Keep riders off. Riders on machine are subject to injury such as being struck by foreign objects and being thrown off machine. Riders also obstruct operator's view, resulting in machine being operated in an unsafe manner.

Never use the attachment or any other part of the machine as a work platform or personnel carrier. Death or severe injury may result.



⚠ WARNING

Be extra careful when traveling on a slope, over rough ground, near ditches and in congested areas. The danger of tipping is always present. Know your machine's capabilities.

⚠ CAUTION

Ensure that tire pressure is within rated limits to prevent personal injury or damage to the machine.

⚠ WARNING

Know how to put your machine in a zero energy state for purposes of inspection, maintenance or repair.

⚠ DANGER

Rotating mulcher blade will cause death or severe injury. Do not start up mulcher until all personnel are 300 feet from Mulcher. Shut down Mulcher head when not in use.

⚠ WARNING

Wear required personal protective equipment at all times to help prevent personal injury. Do not wear loose fitting clothing or personal articles, loose or uncovered long hair, or jewelry.

⚠ WARNING

Failure to keep the engine shrouding area free of flammable debris such as leaves, twigs, and wood chips may cause an extreme fire hazard. KEEP THIS AREA CLEAN. Keep a fire extinguisher on machine.

⚠ WARNING

Before transporting:
-Lower and secure attachment to trailer bed.
-Shut down machine and apply parking brake.
-Install articulating lock pin to prevent articulation.
-Secure machine to trailer bed.

⚠ WARNING

High pressure hydraulic fluid can penetrate skin causing death, gangrene or other severe injury. Seek immediate medical help to remove fluid.

- **Keep hands and body away from areas ejecting fluid. Use piece of cardboard to check for leaks. Wear proper hand and eye protection.**
- **Relieve hydraulic pressure before loosening any hydraulic connections.**
- **Tighten all hydraulic connections before applying hydraulic pressure.**

⚠ WARNING

Remove or secure all personal or maintenance items such as lunch buckets, chains, shovels, tools, etc., before moving or operating machine.

⚠ WARNING

Make sure that all walking and climbing surfaces of machine are free of dirt, debris, water, grease, oil, and snow. Do not leave loose tools or rags on machine. Replace all non-skid material that is torn, missing or damaged.

⚠ WARNING

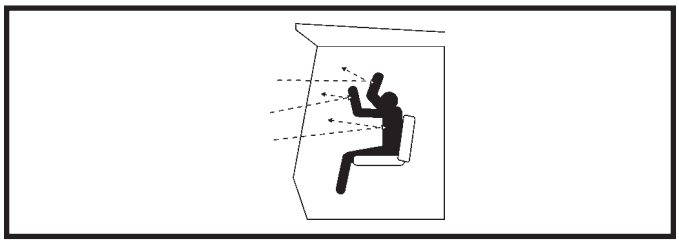
Replace any safety decals that are faded, torn, missing, illegible, or otherwise damaged.

⚠ WARNING

Combustible and flammable fluids can cause death or severe injury. Do not smoke or permit open flames near fuels or hydraulic fluids. Do not fill the tanks to capacity - allow room for fluid expansion. Do not remove the fuel cap or refuel while engine is hot, running or without proper ventilation. Never use fuel for cleaning purposes. Clean up any fluid spills immediately.

⚠ WARNING

Before operating, transparent material such as safety glass must be replaced when it is cracked or broken, or when vision is obscured due to scratches.



⚠ WARNING

Loose or overtorqued bolts can cause death, severe injury, or property damage. Maintain proper bolt torque. Visually check bolts daily. Check torque every 50 hours.

⚠ WARNING

Always maintain 3-point contact with handles and steps when mounting or dismounting. Never jump on or off machine. Do not rush. Walk, do not run.

⚠ WARNING

Stay clear of drivelines when engine is running.

⚠ WARNING

Under no circumstances should any modifications be made to Barko machinery without factory authorization. Any modifications may void the warranty. This machine was designed to do a specific job and alterations could result in death, severe injury or property damage.

⚠ CAUTION

Grease all pivot and cylinder points daily.

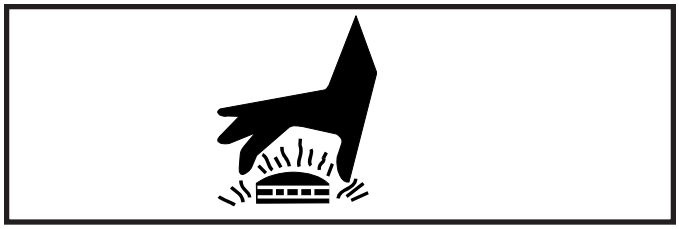
WARNING

Any unauthorized welding, alterations, additions or modifications made to Barko machinery will void warranty. This machine was designed to do a specific job and alterations could result in death, severe injury or property damage.

If Barko-authorized welding must be done, first disconnect both battery cables and all alternator connections or electrical and structural damage to machine may occur.

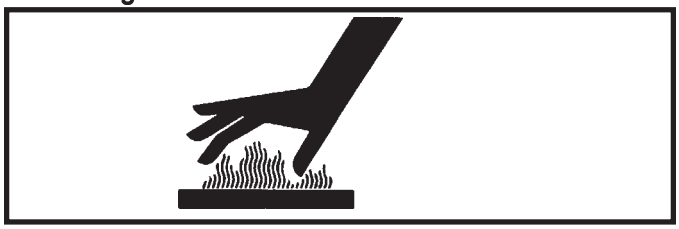
WARNING

Hot and pressurized fluid can cause severe burns. Let system cool before removing any caps. Then remove caps slowly.



WARNING

Hot exhaust pipe can cause severe burns. Do not touch exhaust pipe when hot, or when engine is running.



WARNING

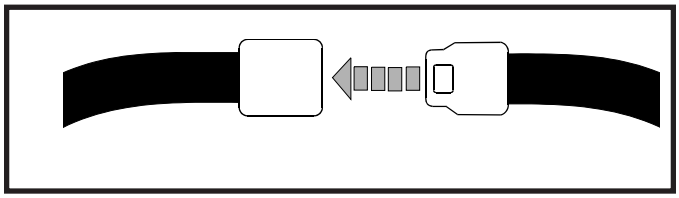
If machine malfunctions during operation, stop machine motion as quickly as possible, lower boom to the ground and shut down the machine. Service or repair the machine as needed before running or operating again.

CAUTION

Use only hydraulic fluid in hydraulic oil reservoir. Use only diesel fuel in fuel reservoir. Other fluids will cause machine damage.

WARNING

Always wear seat belt when operating or running machine.



CAUTION

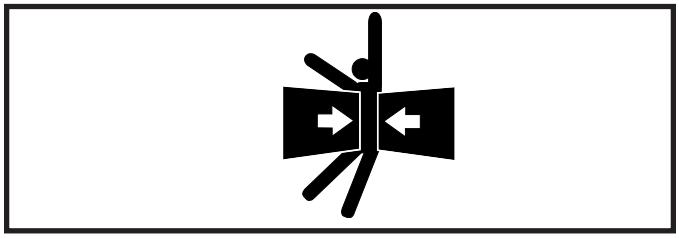
Check the Air Cleaner Assembly daily for cracks, loose clamps, or any other damage. If debris is able to bypass the Air Cleaner for any reason, it can damage the engine.

WARNING

Maintain all components of Muffler Assembly to meet noise and exhaust standards.

WARNING

Stay clear of pivot point. Getting caught in the articulating area of this machine can cause death or severe injury. Do not operate until area is clear of all personnel.



WARNING

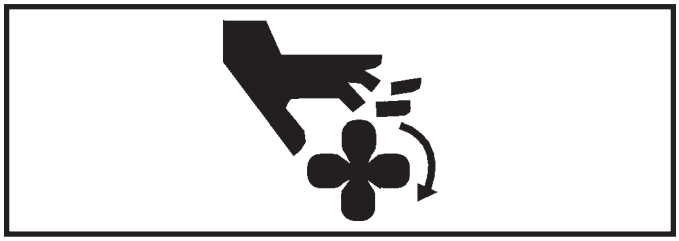
On machines equipped with an accumulator, release all pressure before working on the system. After service work is done, repressurize the accumulator(s) to the proper specification.

WARNING

Use caution when checking items beyond your reach. Use an approved safety ladder.

WARNING

If this machine is equipped with electric motor driven Auxiliary Oil Cooler, be sure battery is disconnected before going near cooler fan. If battery is not disconnected, fan may come on at any time causing severe injury.



WARNING

Do not exceed 15 p.s.i. nozzle pressure when drying parts with compressed air. Do not direct compressed air against human skin. Serious injury could result.

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

FIRE PREVENTION

This machine has several components which are at high temperatures under normal operating conditions, such as engine, exhaust system, brake system and transmission. Also, electrical system (battery, electrical connectors, etc.) can be a source of arcs or sparks if damaged or incorrectly maintained.

Excessive debris will increase the condition for a fire hazard. Flammable debris (twigs, leaves, straw, rags, etc.) must be removed **on a daily basis** or more often if necessary from areas such as the engine, exhaust, battery, electrical connectors, parking brake components, transmission area and belly pan, drive line, fuel, hydraulic and brake systems.

Clean machine often. Periodic high pressure washing of machine is suggested, especially if flammable liquid spills have occurred.

FIRE PREVENTION CHECK LIST

The following list provides data which will help to prevent fires.

- Do not use machine in areas with explosive dust or gases. These elements can be ignited by arcs, sparks, hot components or fumes.

- Inspect cab, engine compartment, and engine cooling system every day. Clean if needed to prevent overheating. Remove all flammable material (rags, debris, fluid spills, etc.)

- Inspect electrical system for damage daily. Keep battery terminals clean & tight. Replace or repair any damaged part.

- Daily, inspect all fuel and hydraulic oil tubes, hoses, and fittings for damage and leakage. Tighten or replace as needed. Always clean fluid spills.

- Allow machine to cool down by idling engine for a while before shutdown. Many engine and transmission fires start after shut-down. This waiting time can be used to inspect machine and perform certain maintenance procedures.

- Keep fire extinguisher, water hose connected to water tank, and first aid kit where easily reached in case of fire and keep these items properly maintained.

- Operating personnel should be instructed on what to do in case of fire and be required to demonstrate use of fire extinguisher and fire suppression equipment.

- Any portable extinguisher or fire suppression system carried on machine that has been used, must be recharged or replaced before machine resumes operating. Extinguisher manufacturers recommended service interval should be followed.

- Do not use ether or starting fluids on diesel engines with glow plugs. These starting aids can explode and injure bystanders.

- Before doing welding of any kind, clean machine and disconnect battery cables. Cover rubber hoses, battery, & other flammable parts. Never ground arc welder or electrical accessories through machine components as arcing may occur causing bearing damage. Keep fire extinguisher nearby.

⚠ WARNING

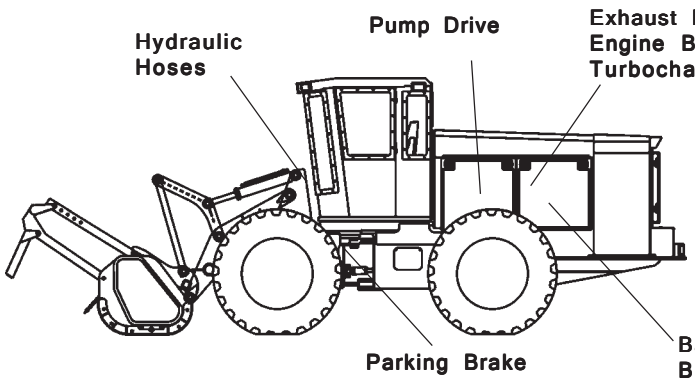
Do not weld on any structural member unless specifically authorized by Barko Hydraulics. Any unauthorized welding or welding procedures will void the warranty, and may cause structural damage.

- Stop engine & allow it to cool before adding fuel. Never smoke while handling fuel or working on fuel or hydraulic system.

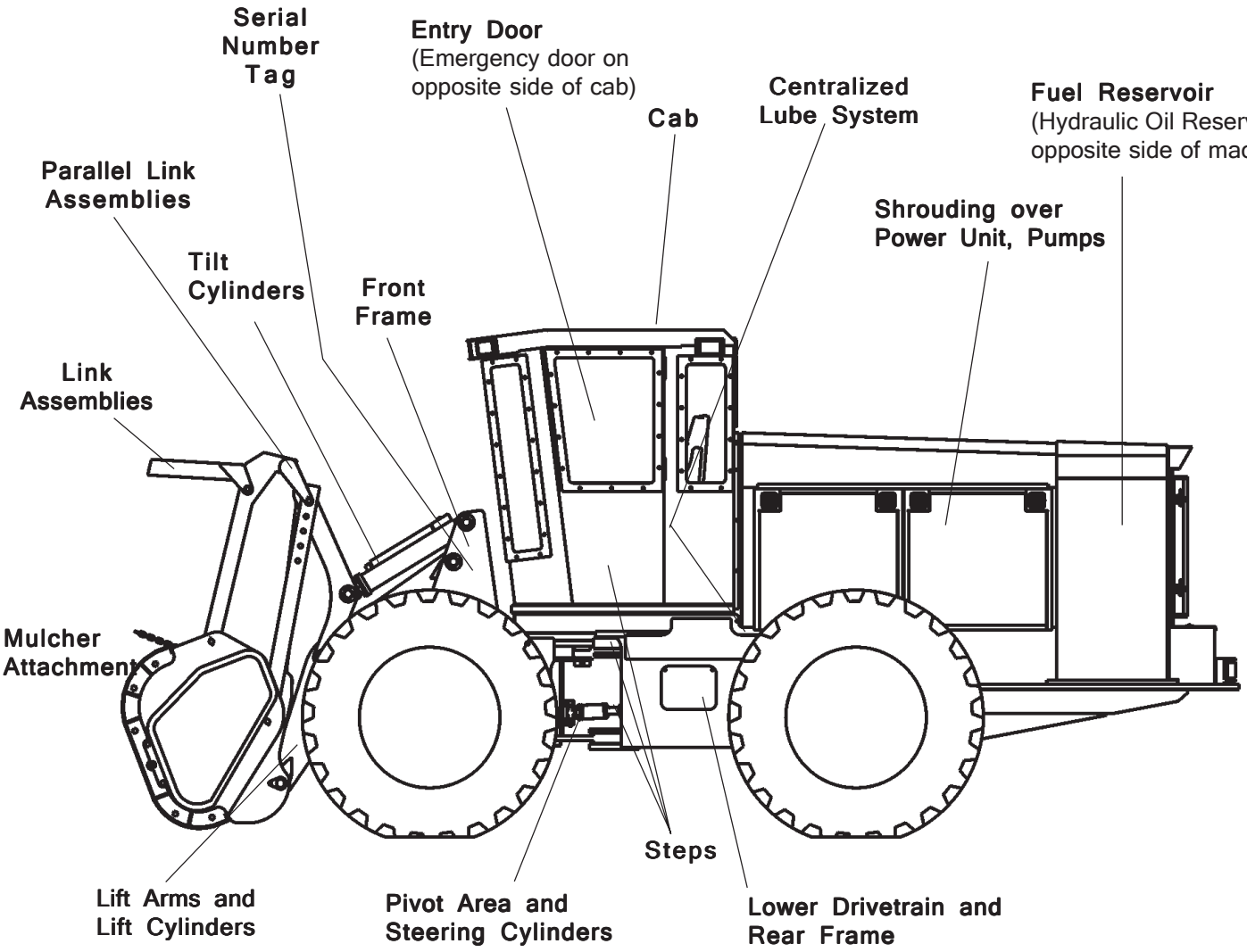
- Read Engine Manual accompanying this manual for complete engine operating and engine safety instructions.

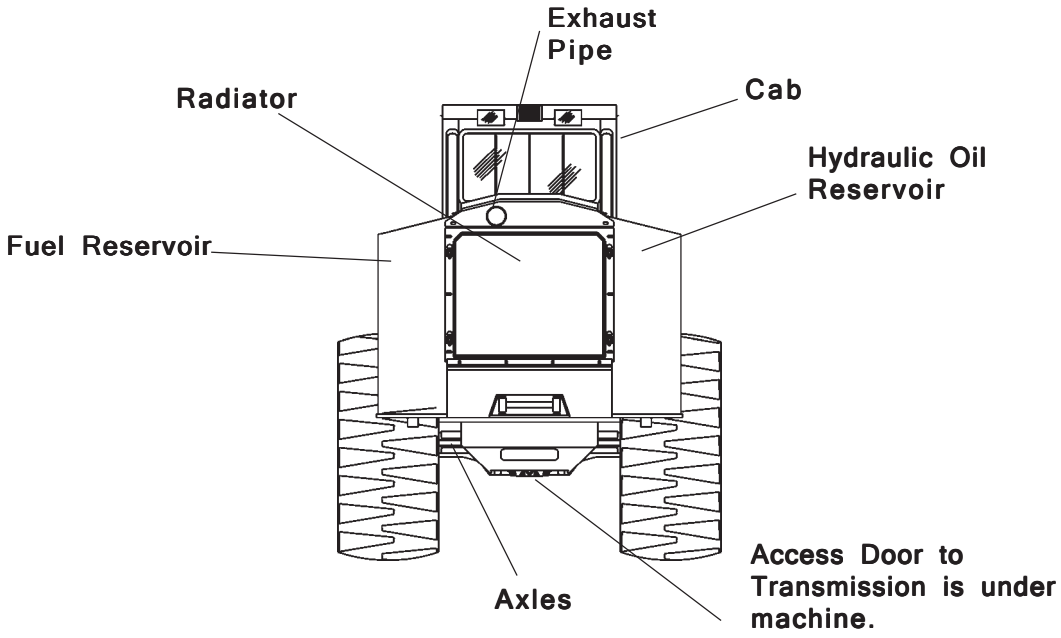
- Use proper battery hook-up procedures. See Electrical System section in service manual.

The following areas are the most common places for fires to start:



MODEL DESCRIPTION





A. PREVENTIVE MAINTENANCE

Maintenance

SAFETY WHILE SERVICING

The following maintenance section gives suggested guidelines for operational maintenance on your machine. In severe conditions (extreme dust, heat, cold, humidity, etc.) you will need to service your machine more often. Your experience will dictate a more severe servicing program.

Safety while servicing your machine is your responsibility. Only qualified and authorized personnel should be permitted to maintain, repair, adjust and inspect the machine.

Read and understand the warnings and safety precautions in the Safety Summary and elsewhere in this manual before doing any service on the machine. The following precautions should be used as a reminder to safe servicing.

⚠ WARNING

Always shut down the machine and lower the mulcher to the ground before working on the machine. If necessary to work on a mulcher attachment, securely support the attachment so that it cannot move or fall in any way.

⚠ CAUTION

Do not leave loose tools and rags on the machine. Ensure that all walking and climbing surfaces are clean.

⚠ WARNING

Handle fuel carefully. Do not smoke while filling fuel tank or working near fuel.

Refer to Fluid Specifications whenever replacing oils, fluids, or filling fuel tank.

⚠ WARNING

Do not weld on any structural member unless specifically authorized by Barko Hydraulics. Any unauthorized welding or welding procedures will void the warranty, and may cause death, severe injury, property damage or structural damage to the machine.

⚠ WARNING

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under a load. Do not work under a machine that is supported solely by a jack.

⚠ CAUTION

Check the Hour Meter regularly to determine when the machine needs periodic maintenance. Use the intervals on the Service Schedule except when operating in extreme conditions; then shorter intervals must be used.

⚠ WARNING

Under no circumstances should any modifications be made to Barko machinery without factory authorization. Any modifications may void the warranty. This machine was designed to do a specific job and alterations could result in death, severe injury or property damage.

⚠ CAUTION

Do not exceed 15 PSI nozzle pressure when drying parts with compressed air. Do not direct compressed air against human skin. Serious injury could result.

REMEMBER: SAFETY FIRST!

PREVENTIVE MAINTENANCE

Preventive maintenance is really just a simple matter of common sense. If you keep any piece of mechanical equipment clean and properly lubricated, and promptly replace any worn or damaged parts, you are going to "prevent" deterioration and promote long life and safe, productive service. The only other requisite to such a program is the regular scheduling of such maintenance.

Obviously, when you are operating under severe job conditions, such as a dusty job site, in extreme heat or cold, a long operating day, or extremely heavy loads, the recommended intervals in the schedule should be shortened.

The suggested schedule on the following page is designed to be just a reminder of what should be done. For detailed instructions on each item, consult the Table of Contents for where each is located in this manual.

⚠ WARNING

Instructions are necessary before doing service on machine. See warnings and instructions both at the beginning and throughout this manual. After doing service or making repairs or adjustments always check function of machine.

Safety glasses or goggles are always needed for eye protection from electric arcs, from shorts or welding, battery acid, compressed springs, fluids under pressure, and flying debris or loose material when engines are running or tools are used. Use eye protection approved for type of welding. Failure to obey warnings can cause death, severe injury or property damage.

SPECIAL NEW-MACHINE INSTRUCTIONS

AFTER THE FIRST 50 HOURS OF OPERATION OF A NEW MACHINE

A new machine needs a special maintenance procedure after the first 50 hours of operation.

1. Do a complete inspection of the machine. Rectify any problems, replace any damaged parts.
2. Check torque of bolts and nuts (retorque if necessary):
3. Change all filter elements.
4. Change hydraulic oil in hydraulic oil reservoir.

Resume the normal maintenance intervals after this. See the Service Schedule for more information.

SERVICE SCHEDULE

SERVICE REQUIRED	8 hours Daily	50 hours Weekly	100 hours Monthly	400 hours 2 Months	1000 hrs 6 Months	Yearly
Hydraulic Reservoir - check level and quality of oil.						
Fuel Tank - Check level and fill if necessary.						
Engine Crankcase Oil - Check level.						
Engine Radiator - Check coolant level and fill if necessary. Inspect exterior for dirt and debris and clean if necessary.						
Engine Air Cleaner - Inspect for cracks, loose clamps, or other damage. Inspect dust cup for dust - empty if needed. Check restriction of Air Cleaner daily - replace filter as needed.						
Fan and Drivebelts - Check for looseness and wear. Tighten or replace as needed.						
Pump Drive - Check fluid level. Add 80-90 gear fluid if needed						
Axle Outer Bearings - Grease daily when operating in deep mud, dirt or water.						
Axle Wheel Retainer Cap Screws or Stud Nuts - after first 10 hours, check and tighten to proper torque value if needed.						
Axle Differential Oil Level - Check after first 10 hours.						
Hoses, Connections, Cylinders - Inspect for leaks and damage. Tighten, repair, or replace parts if necessary.						
Operator's Platform - Clean area of debris, tools, rags, water, ice, and snow.						
Tires - Check for correct pressure.						
Bolts/Nuts - Visually inspect for wear or damage.						
Fittings - Lubricate as shown on Lubrication Points. Use a multi-purpose grease.						
Transmission - Check fluid level. Add fluid if necessary. See Lubrication Points for type.						
Hydraulic Oil Filter - On new machines the filter element should be replaced first at 50hrs. and then at 400 hrs. thereafter.						
Hydraulic Oil Reservoir - On new machines the oil must be changed after the first 50 hours, and then every 1000 hours after that.						

SERVICE REQUIRED	8 hours Daily	50 hours Weekly	100 hours Monthly	400 hours 2 Months	1000 hrs 6 Months	Yearly
Axle Wheel Retainer Cap Screws or Stud Nuts - after first 50 hours, check and tighten to proper torque value if needed.						
Axle Differential Oil Level - Check after first 50 hrs.						
Engine Air Cleaner Filter - Replace Filter. *						
Engine Shrouding - Clean and inspect.						
Safety treads, safety signs, seat belt - Check for damaged or missing items and replace.						
Wheel Nuts - Tighten if needed.						
Bolts/Nuts - Check for proper torque every 50 hours. Retorque if necessary.						
Engine Oil Filter - Replace filter and oil.						
Hydraulic Oil Cooler and Radiator - Clean.						
Hydraulic Oil Reservoir Breather - Replace.						
Battery - Clean and coat posts with grease. Check electrolyte level and fill if necessary.						
Axle Pivots - Lubricate.						
Axle Outer Bearings - Grease.						
Axle Differential Oil - Change, after first 100 hours.						
Entire Machine - Steam clean when dirty or every month. Inspect for stress, wear, cracks, damage, and loose parts.						
Accumulators - Check pressure and maintain at 1200 PSI.						

* -Your Barko built machine is available with various engine options. These engines are equipped with a restriction indicator provided by the engine manufacturer. Barko recommends that you consult the Operators manual provided by the engine manufacture for recommendations on air cleaner element change intervals.

Barko also recommends that you consult your Operators manual provided by the engine manufacturer to ensure that filter elements other than the ones provided by the engine manufacturer have been tested and meet there qualifications.

SERVICE REQUIRED	8 hours Daily	50 hours Weekly	100 hours Monthly	400 hours 2 Months	1000 hrs 6 Months	Yearly
Hydraulic Oil Filters - Replace elements every 400 hours, after initial change at 50 hours on a new machine.						
Pump Drive - Replace fluid using 80-90 gear fluid.						
Axle Differential Oil - Check oil level.						
Hydraulic Reservoir - Replace oil and clean suction screens.						
Engine Coolant - Replace coolant.						
Brakes - Replace or adjust.						
Wheel Bearings - Clean and inspect. Replace if needed. Pack with grease.						
Axle Differential Oil - Change.						
Pump Drive Pads - Lubricate pump pad splines with 80-90 gear fluid. See Pump Drive Maintenance in Service Manual for specifications.						
Air Conditioner Air Intake Filter - Replace.						

NOTE : Use the intervals on Service Schedule when operating in normal conditions. Service the machine at shorter intervals when operating in very hot, cold, dusty, or humid conditions.

TIRES

DAILY MAINTENANCE

Visually inspect the tires for proper inflation, and for cuts, gouges, blisters or tread separation.

Check the tire pressure. Make sure all tires are properly inflated.

WARNING

Improperly inflated tires can cause excessive heat build-up resulting in blowouts. Always keep tires inflated to the proper pressure. Unexpected blowouts may cause injury or death.

CAUTION

Over or under inflated tires can cause a drastic reduction in tire and rim life.

CAUTION

Keep the valve caps on to prevent dirt from entering the valves. Dirt will cause valve damage.

TIRE INFLATION PRESSURE

Tire pressure may vary slightly depending upon the tires:

28L-26 Tires	30 PSI

LUBRICATION POINTS (PERFORM DAILY)

GREASE

ENGINE OIL

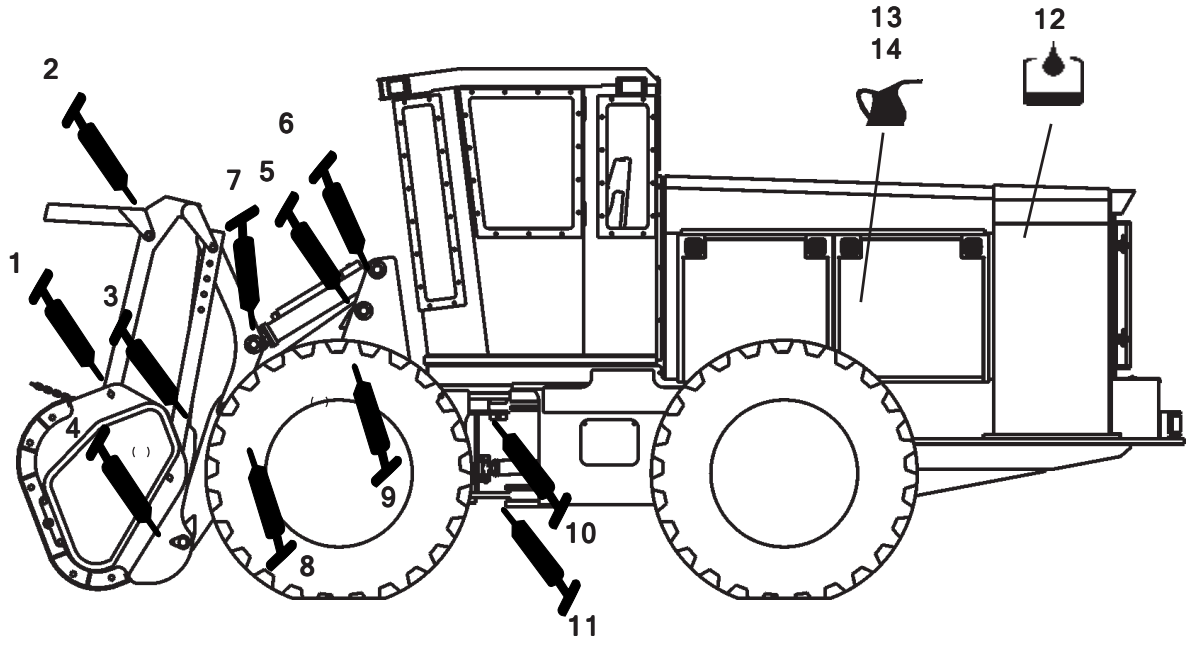
HYDRAULIC OIL

EP 80-90 GEAR FLUID

1 Link to Attachment Pivots
2 Link to Parallel Link Pivots
3 Parallel Link to Lift Arm Pivots
4 Lift Arm to Attachment Pivots
5 Lift Arm to Front Frame Pivots
6 Tilt Cylinder to Front Frame Pivots
7 Tilt Cylinder to Parallel Link Pivots
8 Lift Cylinder to Lift Arm Pivots
9 Lift Cylinder to Front Frame Pivots
10 Upper Frame Pivots
11 Lower Frame Pivots
12 Hydraulic Oil Reservoir (check level)
13 Pump Drive (check level)
14 Pump Drive Pads (check level)

For Drive Train, Axle Pivots and Steering Cylinder Lubrication, see next page. For Attachment Lubrication, see separate attachment manual.

See Pump Drive Maintenance for lubrication specifications.



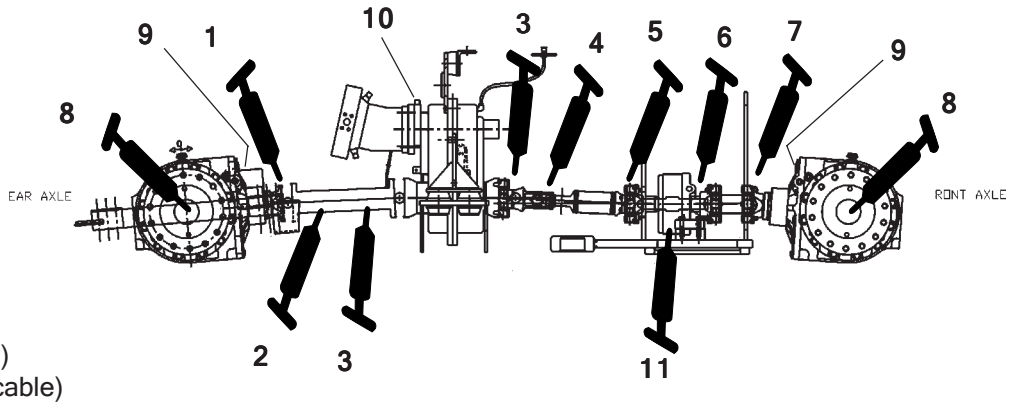
WARNING

Always shut down machine and lower Mulcher attachment to the ground before working on the machine. If necessary to work on a lifted attachment, securely support the attachment so that it cannot move or fall in any way.

(PERFORM DAILY)

GREASE

DRIVE TRAIN LUBRICATION



1 Rear U-joint
2 Rear Slip Yoke
3 Transmission U-joint
4 Front Slip Yoke
5 Mid U-joint (if applicable)
6 Carrier Bearing (if applicable)
7 Front U-joint
8 Axle Wheel Ends
9 Axle Differentials (see below for fluid type)
10 Transmission (see below for fluid type)
11 Break (see below for fluid type)

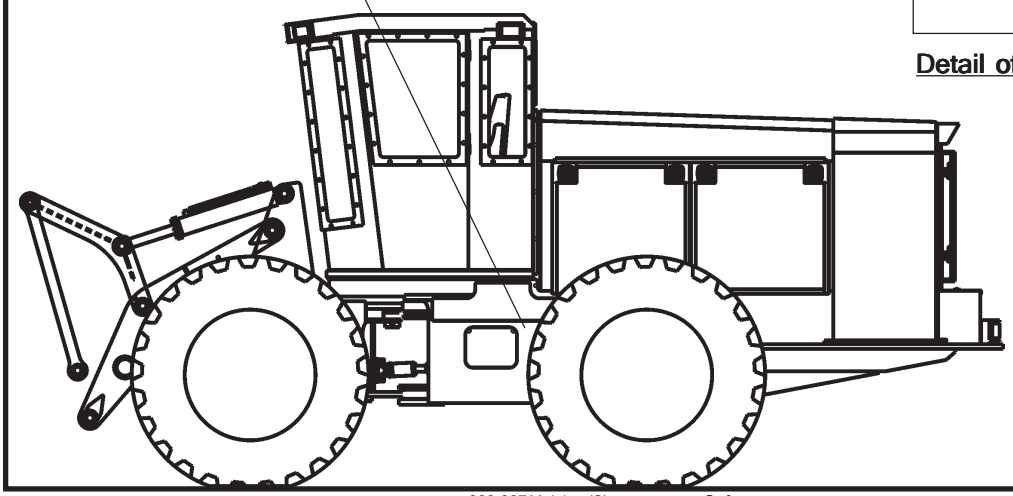
Axle Differentials: "John Deere Hy-Gard" or "Amoco 1000" Transmission/Hydraulic Oils.
Transmission: 80-90 Gear Lube.

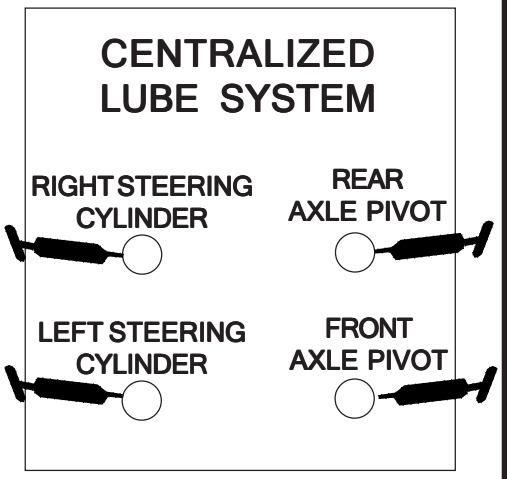
GREASE

AXLE PIVOTS AND STEERING CYLINDER LUBRICATION

The Centralized Lube System contains grease fittings which connect, via hoses, to axle pivots and steering cylinders.

Centralized Lube System location.
See detail at right.



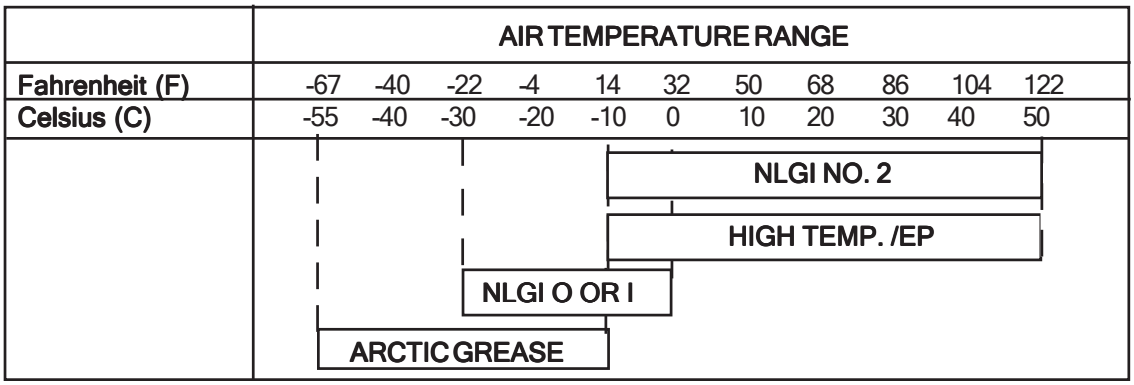


Detail of Centralized Lube System

FLUID SPECIFICATIONS

GREASE

Use grease shown on chart below, depending on the expected air temperature range.


AIR TEMPERATURE RANGE
Fahrenheit (F)
-67 -40 -22 -4 14 32 50 68 86 104 122
Celsius (C)
-55 -40 -30 -20 -10 0 10 20 30 40 50
NLGI NO. 2
HIGH TEMP. /EP
NLGI O OR I
ARCTIC GREASE

HYDRAULIC OIL

The following lists some features to look for in an oil. The hydraulic oil for the machine should feature:

- Rust resistant additives to prevent rust formation from moisture condensation.
- Anti-foaming agents to break up air bubbles and prevent "foaming" that may cause sluggish and erratic operation.
- High stability to resist oxidation and prevent varnish formation and deposits that foul systems.
- Anti-wear properties to prevent scuffing and exccesive wear at high speeds and high pressures.
- Good viscosity index for easy flow at low temperatures without thinning out at high temp's after hours of use.

For operation in different temperatures, refer to the following chart for selection of hydraulic oil.

ISO Viscosity Grade	Average Ambient Temp.	System Operating Temperature
46	32° F. to 45° F.	150° F. Max.
68	ABOVE 45° F.	190° F. Max.

Below 32° F. ambient, consult the factory.

ENGINE OIL

Refer to the specifications in the engine manufacturer's manuals that are supplied with every new machine.

FUEL SPECIFICATIONS

Use grade no. 2-D fuel above 40 degrees F.
Use grade no. 1-D fuel below 40 degrees F.
Use grade no. 1-D fuel for all air temperatures at altitudes.

NOTE: Change the engine oil at one half the normal interval if fuel sulfur content exceeds 0.5%. Use fuel with less than 1.0% sulfur. Use fuel with less than 0.5% sulfur if possible. Sediment and water should not exceed 0.10% for maximum filter life.

The Cetane number should be 40 minimum. A fuel with a higher Cetane number may be required if operating the machine where air temperatures are normally low or where altitudes are high. In cold weather operation, the cloud point should be 10 degrees F. below lowest normal air temperatures.

FUEL STORAGE

NOTE: Diesel fuels stored for a long time may form gum or bacteria and plug filters.

Keep fuel in a clean container and store in a protected area. Water and sediment must be removed before fuel gets to the engine. Do not use de-icers to remove water from fuel. Do not depend on fuel filters to remove water.

NOTE: Keep all dirt, scale, water, or other foreign material out of fuel.

Store fuel drums on sides with plug up.

ALTERNATIVE LUBRICANTS

Conditions in certain geographical areas may require special lubricants and lubrication practices which do not appear in this manual.

LUBRICANT STORAGE

The machine can operate at top efficiency only if clean lubricants are used. Use a clean container to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants. Store drums on sides.

⚠ WARNING

Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks but do not use bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention.

SPECIAL TORQUE SPECIFICATIONS

WARNING

Loose or overtorqued bolts can cause death, severe injury, or property damage. Maintain proper bolt torque. Visually check bolts daily. Check torque every 50 hours.

WARNING

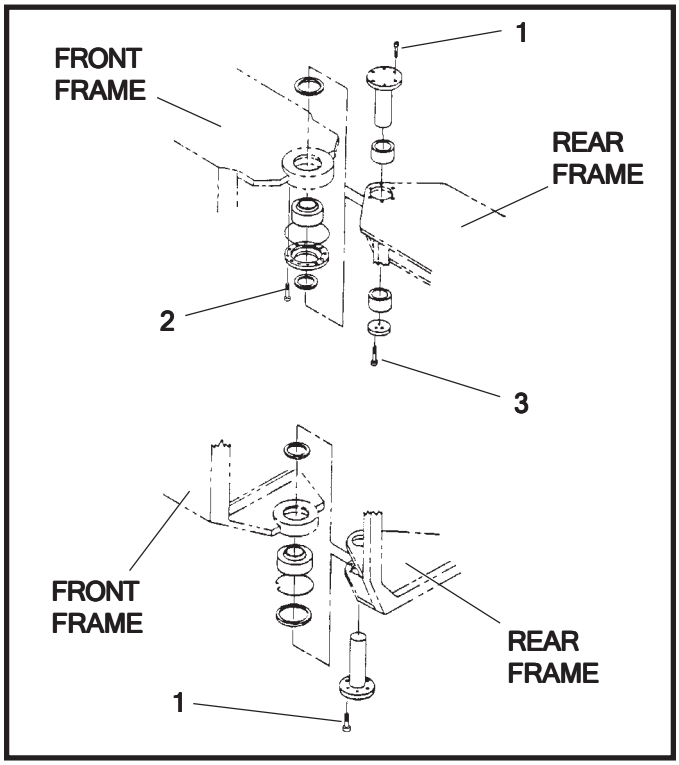
In critical applications (or for grade 8 or grade 9 bolts), once the old bolts and nuts have been loosened, they must be replaced rather than re-tightened and re-torqued. Original clamping force cannot be achieved using the old bolts and nuts.

Lubricate with anti-seize compound, 514-00700.

SPECIAL TORQUE SPECS FOR FRAME PIVOT

On the Frame Pivot (center section) of machine there are cap screws that must be torqued as follows:

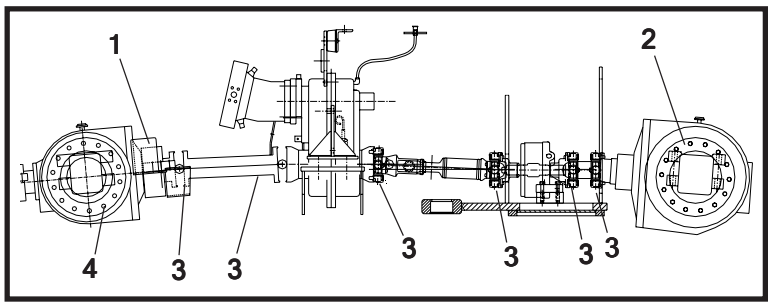
1	80-85	Ft. Lbs. using Loctite #242
2	22	Ft. Lbs. using Loctite #271
3	90-95	Ft. Lbs. using Loctite #242



SPECIAL TORQUE SPECS FOR DRIVETRAIN

Lubricate with anti-seize compound, 514-00700.

1	Rear axle mounting bolts	252 Ft. Lbs.
2	Front axle mounting bolts	400 Ft. Lbs.
3	Driveshaft mounting bolts	70-75 Ft. Lbs.
4	Wheel mounting bolts	226 Ft. Lbs. (Change to Grade 8 bolts effective 09/01/08 and 310 Ft. Lbs)



VALVE BANK STUDS/NUTS:

Tighten in a clockwise pattern so that all nuts are tightened equally without binding on the valve bank. Final torque should be:

K170 valves ..... 43 Ft. Lbs. (60 Nm)
K220 valves ..... 59 Ft. Lbs. (80 Nm)
L90 valves ..... 33 Ft. Lbs. (45 Nm)

GENERAL TORQUE SPECIFICATIONS

See Special Torque Specifications that pertain specifically to this machine.

⚠ WARNING

Grade 9 bolts must be used with Grade 9 washers.

⚠ WARNING

Do not re-use grade 8 or grade 9 bolts or nuts - replace with new ones.

⚠ WARNING

Loose or overtorqued bolts can cause death, severe injury, or property damage. Maintain proper bolt torque. Visually check bolts daily. Check torque every 50 hours.

GRADE 5

SAE GRADE 5 RECOMMENDED TORQUE FOOT POUNDS

DIA.	DRY		* LUBRICATED	
	COARSE	FINE	COARSE	FINE
1/4	9	10	5	6
5/16	17	20	10	12
3/8	31	35	19	21
7/16	50	55	30	33
1/2	75	85	45	51
9/16	110	120	66	72
5/8	150	170	90	100
3/4	265	300	160	180
7/8	400	435	240	260
1	600	650	360	390
1-1/8	800	900	480	540
1-1/4	1120	1240	670	745
1-3/8	1470	1670	880	1000
1-1/2	1950	2200	1170	1320

GRADE 8

SAE GRADE 8 RECOMMENDED TORQUE FOOT POUNDS

DIA.	DRY		* LUBRICATED	
	COARSE	FINE	COARSE	FINE
1/4	12	14	7	9
5/16	25	27	15	17
3/8	44	49	26	30
7/16	70	78	42	47
1/2	107	120	64	72
9/16	154	171	92	102
5/8	212	240	127	144
3/4	376	420	226	252
7/8	606	668	364	400
1	909	995	545	597
1-1/8	1288	1444	773	866
1-1/4	1817	2012	1090	1207
1-3/8	2382	2712	1430	1627
1-1/2	3161	3557	1897	2134

* This is lubed torque. Lubricate with anti-seize compound part no. 514-00700.

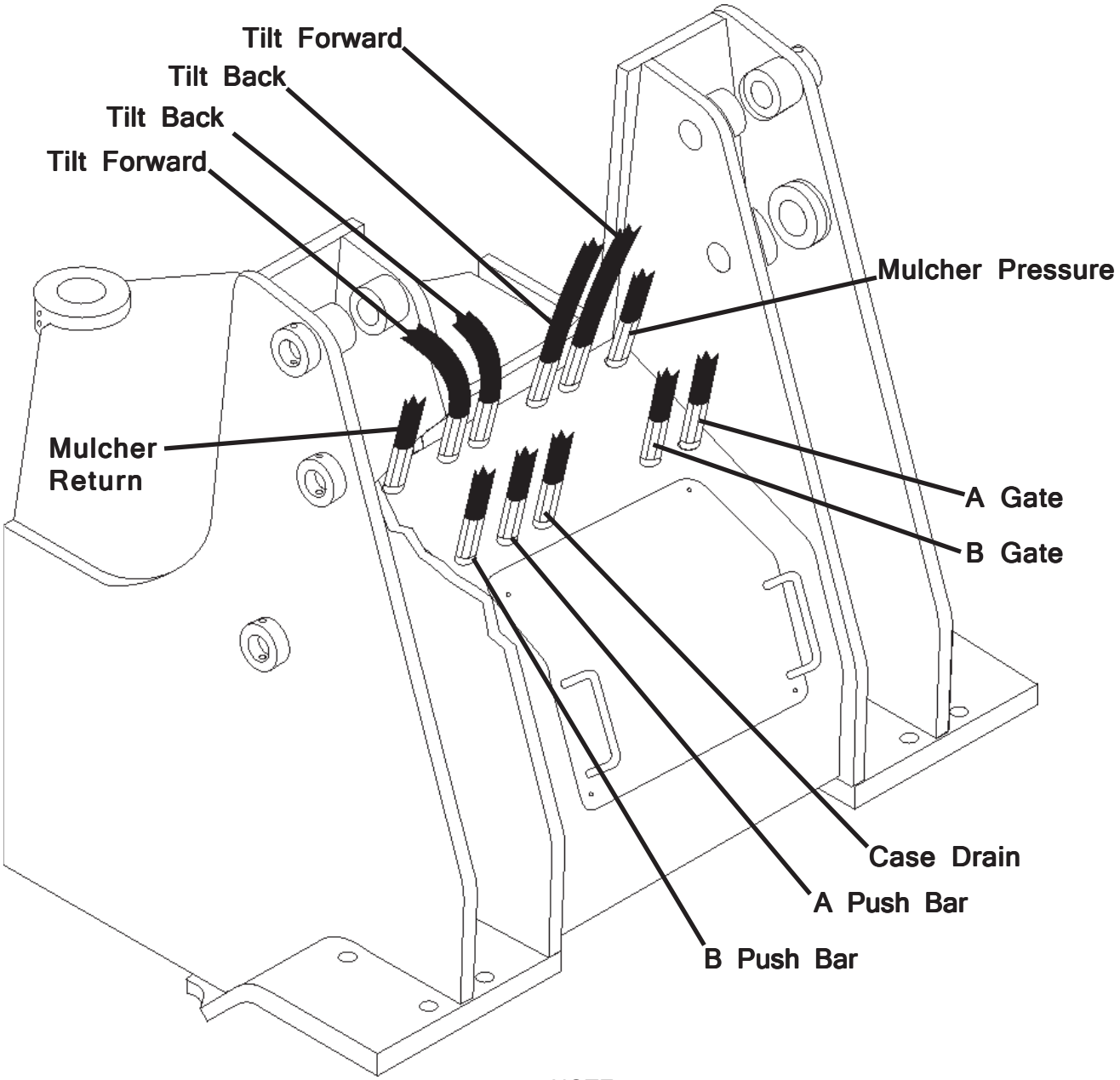
GRADE 9 (MIN. 8 RADIAL MARKS ON HEAD) GRADE 9 (BOW-MALLOY) RECOMMENDED TORQUE FOOT POUNDS

DIA.	DRY		* LUBRICATED	
	COARSE	FINE	COARSE	FINE
1/4	17	19	10	12
5/16	34	37	20	22
3/8	60	68	36	41
7/16	96	108	58	65
1/2	145	165	87	100
9/16	210	235	125	140
5/8	290	330	175	200
3/4	515	575	310	345
7/8	830	980	500	590
1	1250	1350	750	810
1-1/8	1750	1950	1050	1170
1-1/4	2500	2750	1500	1650
1-3/8	3250	3700	1950	2220
1-1/2	4350	4850	2600	2900

B. HYDRAULIC SYSTEM

Maintenance

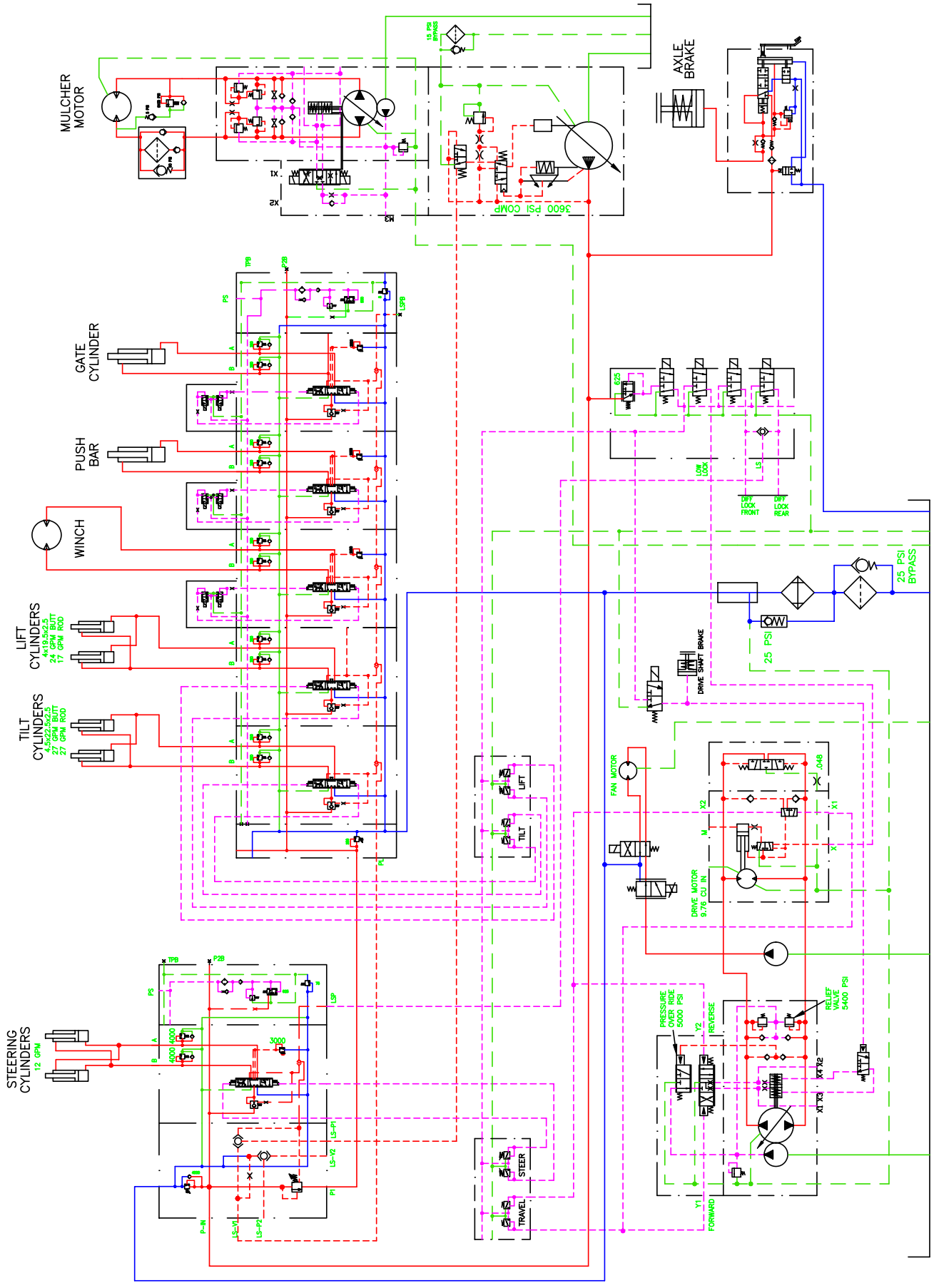
HYDRAULIC HOSE HOOKUP



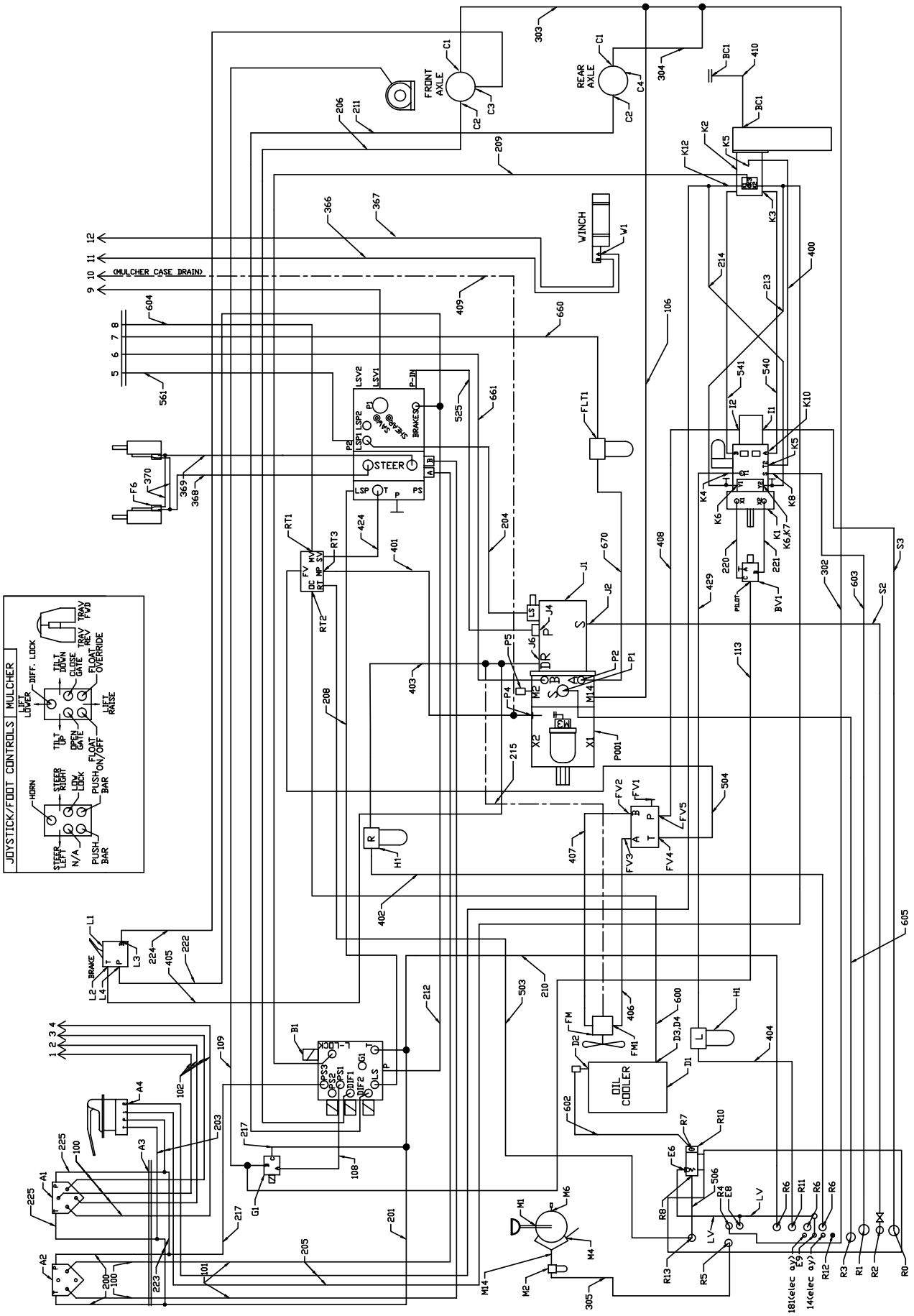
NOTE:
Lift arms, lift cylinders and lift hoses are not shown.

Lift hoses run from end of lift cylinders through cutouts in each side of front frame plate to valve bank.

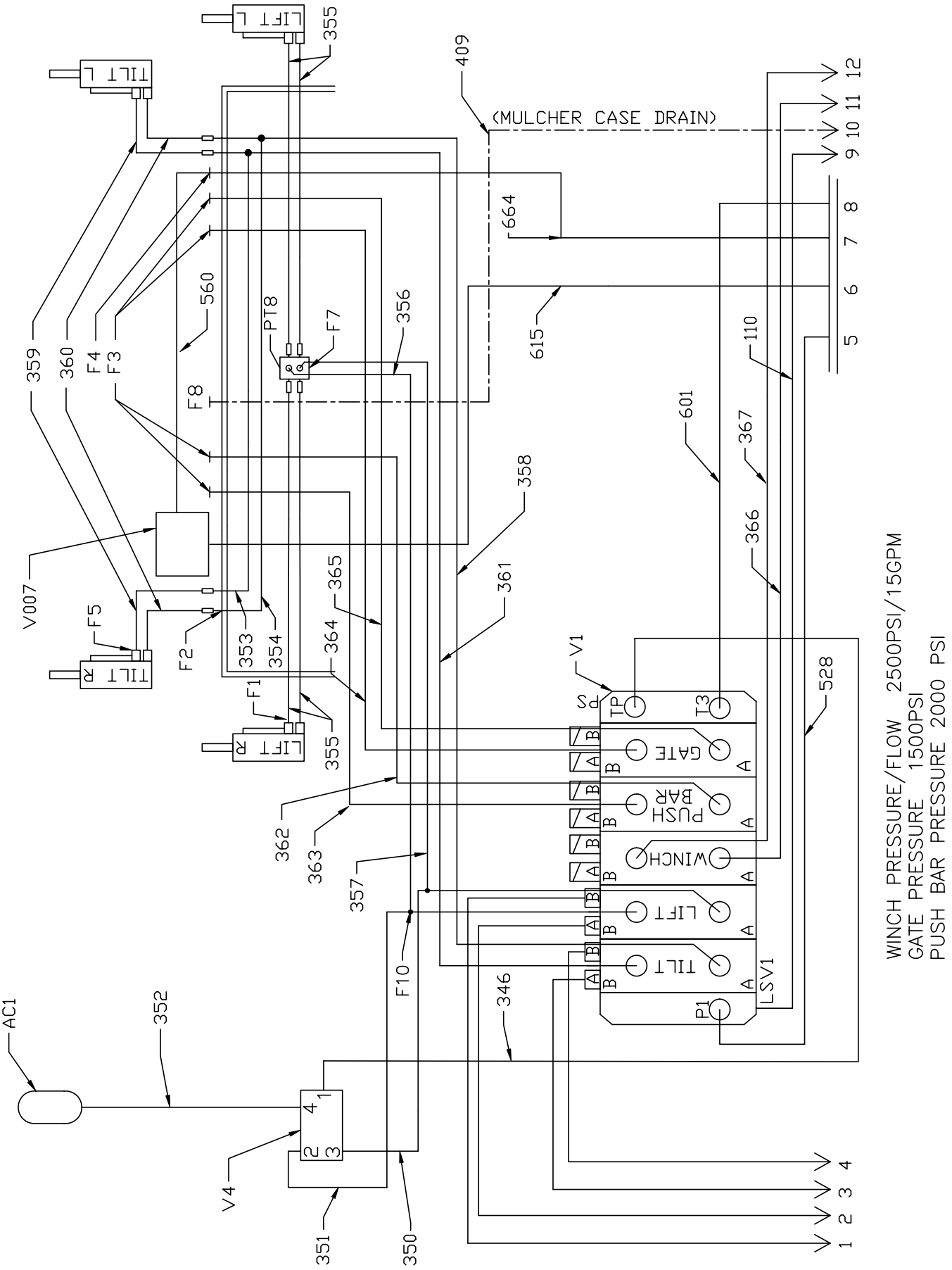
HYDRAULIC SCHEMATIC 607-00145



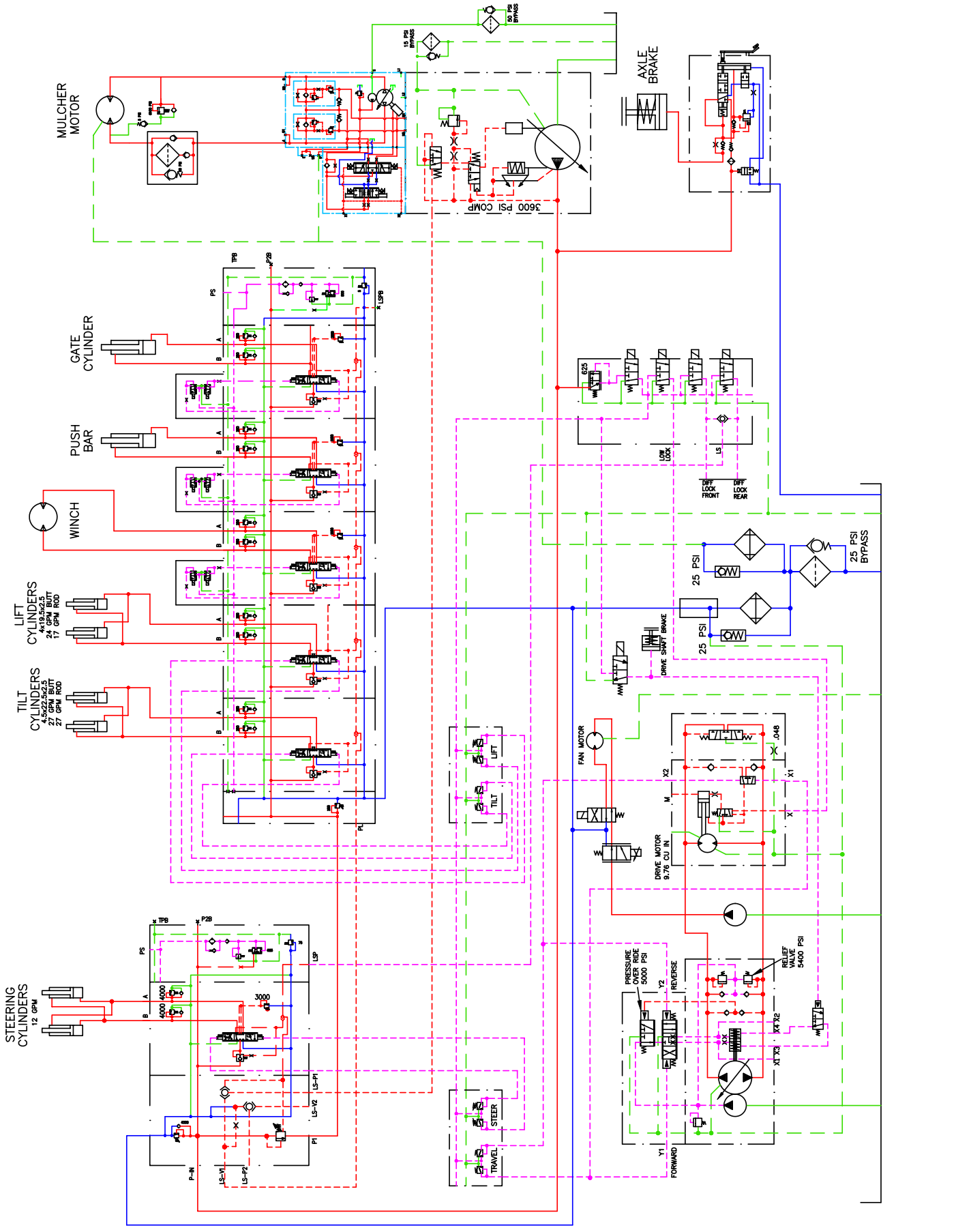
HYDRAULIC ASSEMBLY 765-40035
REAR FRAME



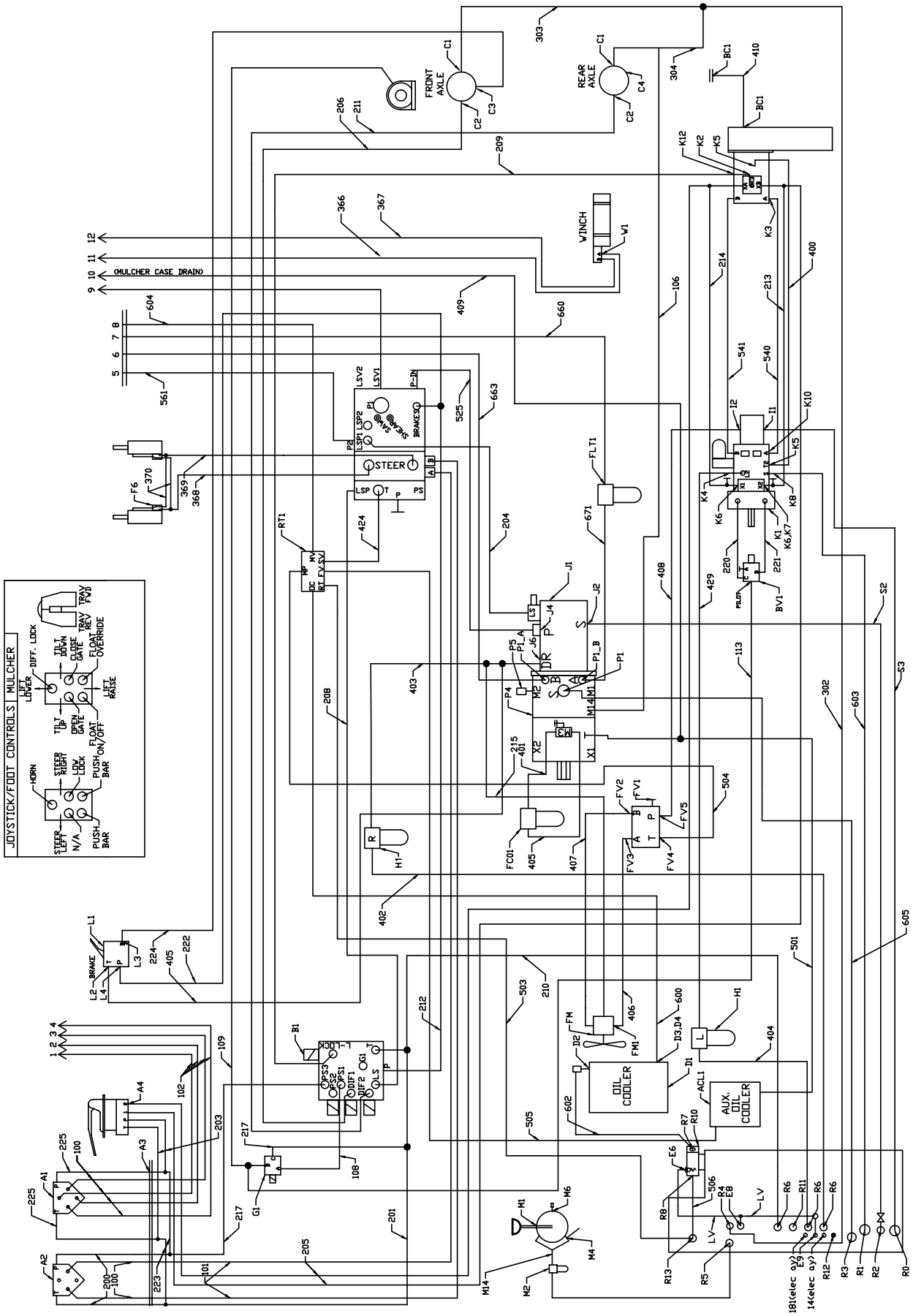
HYDRAULIC ASSEMBLY 765-40035
FRONT FRAME



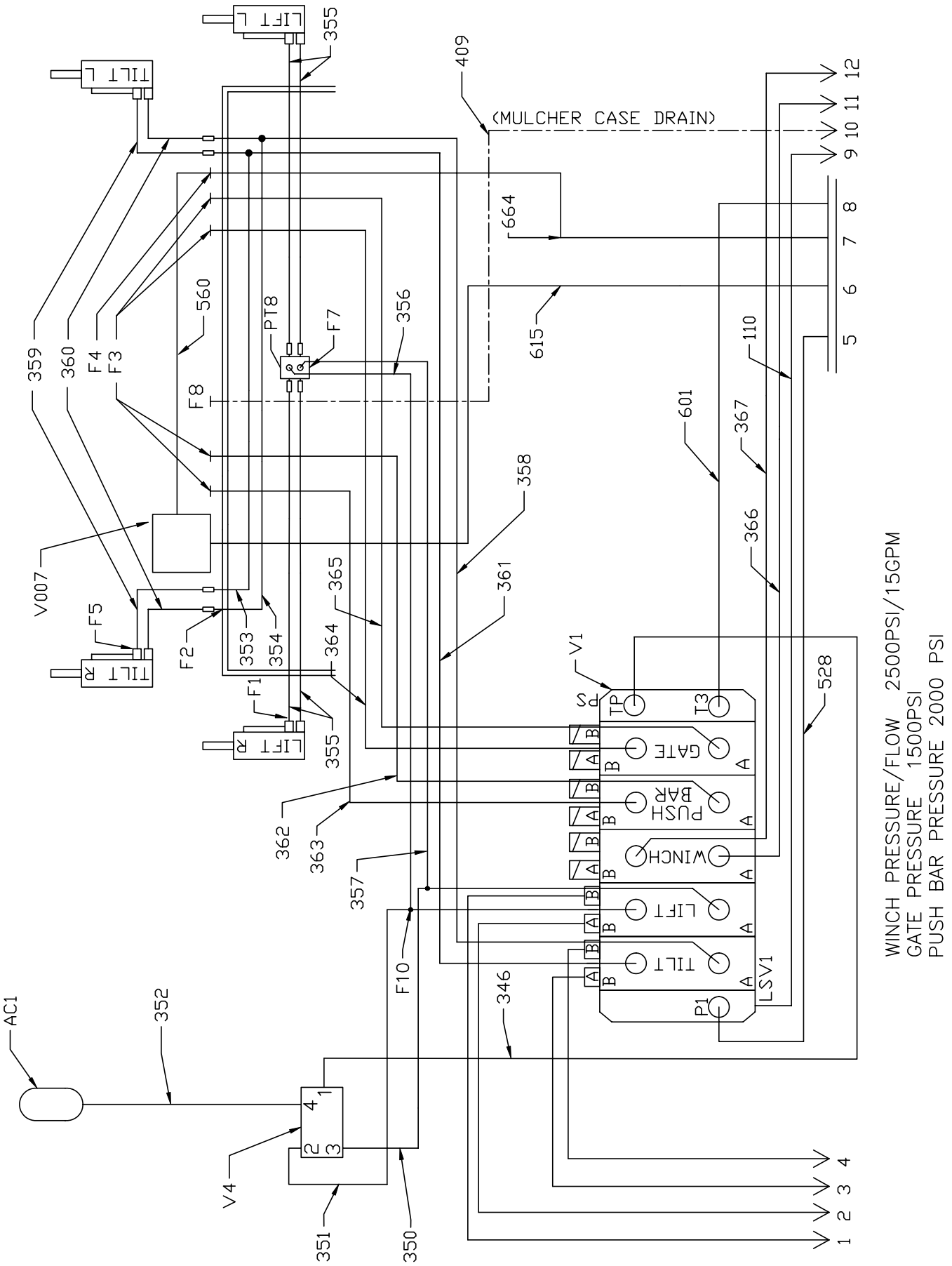
HYDRAULIC SCHEMATIC 607-00149



HYDRAULIC ASSEMBLY 765-40040
REAR FRAME



HYDRAULIC ASSEMBLY 765-40040
FRONT FRAME



PRESSURE SETTINGS (MULCHER MACHINES)

MULCHER PRESSURE SETTINGS

System Pressure (P.O.R. setting, on the Drive Pump) ..... 5000 PSI
NOTE: System Pressure (P.O.R. setting) must be set 300 PSI under System Relief Pressures.
System Relief (forward) Pressure (set at the Drive Pump) ..... 5300 PSI
System Relief (reverse) Pressure (set at the Drive Pump) ..... 5300 PSI
Charge Pressure (set at the charge pressure relief valve on the Drive Pump) ..... 450 - 500 PSI
Differential Lock/Servo Pressure ..... 625 PSI
Mulcher Drive (accelerating) ..... 4800 PSI
Mulcher Drive (braking) ..... 2500 PSI
Mulcher Charge Pressure (set at the charge relief on the Mulcher Pump, see Figure 1) ..... 300 PSI
Accessory Pump Standby Pressure ..... 400-450 PSI
Accessory Pump Max Pressure ..... 3600 PSI

VALVE BANK PRESSURE SETTINGS

(See Figure 1)
NOTE: Port reliefs on Front Valve Bank are non-adjustable.

Gate:	open - port B	1500 PSI
	close - port A	1500 PSI
Push Bar:	open - port A	2000 PSI
	close - port B	2000 PSI
Mulcher Head Lift:	up - port A	4000 PSI
	down - port B	4000 PSI
Mulcher Head Tilt:	up - port B	4000 PSI
	down - port A	2500 PSI
Winch:	up - port A	2500 PSI
	close - port B	2500 PSI
System Pressure (set at Accessory Pump)		3600 PSI

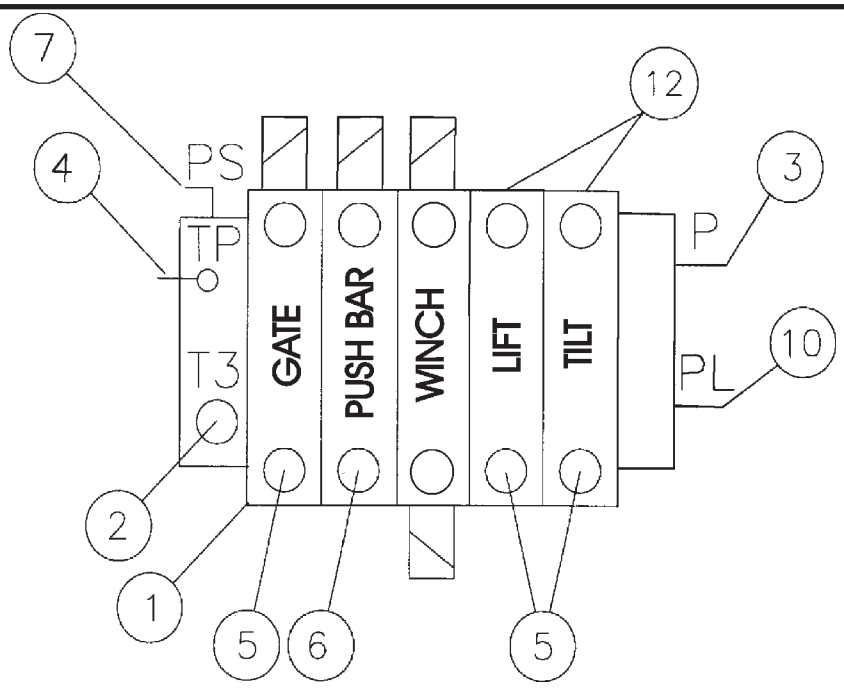
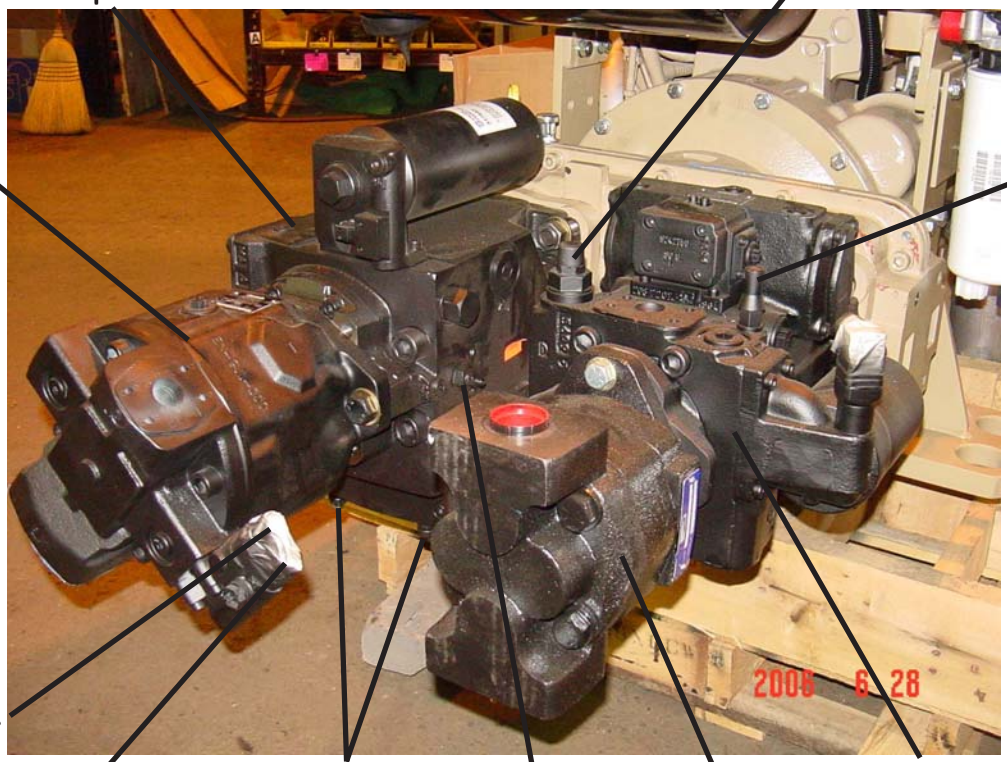


Figure 1 - Top View of Mulcher Valve Bank

PUMP LAYOUT


Sauer
Mulcher Pump
Safety relief
Rexroth
Accessory
Pump
Max
Pressure
POR
Compensater
Standby /
Differencial
Mulcher Pump Max
pressure set screws
Charge
Pressure
Metaris
Fan Pump
Rexroth
Drive Pump

Sauer
Mulcher Pump
Rexroth
Accessory
Pump
Forward
Pressure
Sauer Drive
Pump
Reverse
Pressure
Compensater
Standby /
Differencial
Charge
Pressure
Denison Fan
Pump
Charge
Pressure

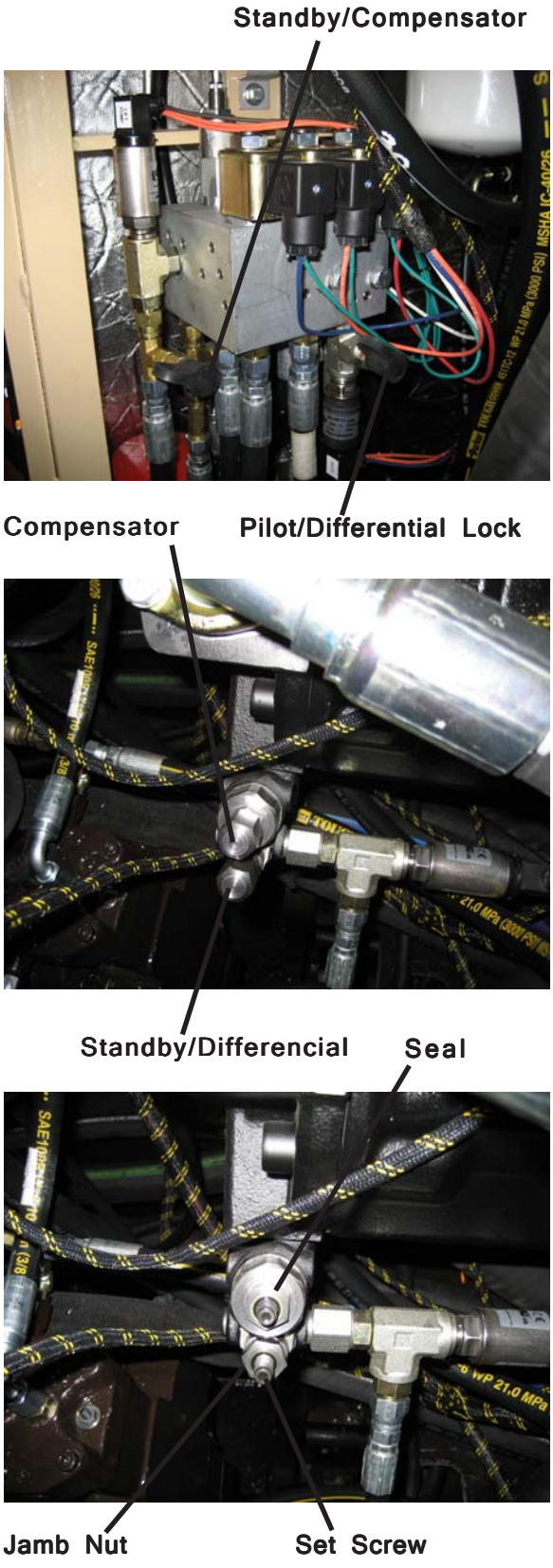
REXROTH ACCESSORY PUMP

MULCHER MACHINE PRESSURE ADJUSTMENTS CONTINUED...

REXROTH ACCESSORY PUMP ADJUSTMENT PROCEDURE

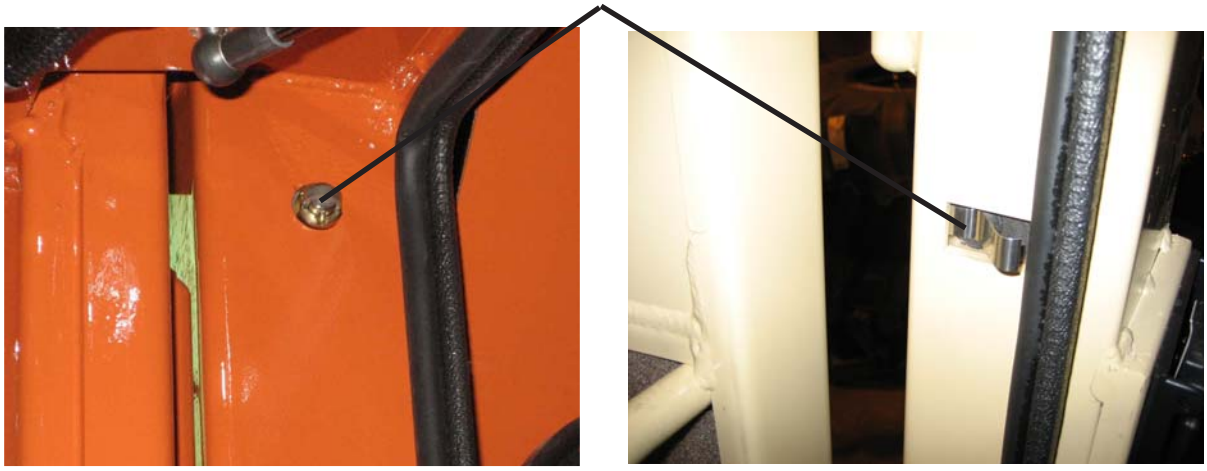
1. Install pressure gauge on the standby pressure check (located on the firewall under manifold).
2. Remove caps on pressure adjustment screws. When removing be careful not to loose seal on bottom of cap.
3. Start engine and run just above an idle.
4. Loosen jamb nut on standy/differencial set screw.
5. Adjust standby/differencial set screw to between 400 - 450 PSI.
6. Tighten jamb nut, replace cap.
7. With engine just above idle, stall out the lift or tilt function.
8. Loosen jamb nut on compensator set screw.
9. Adjust compensator set screw, with function stalled out, set accessory pump pressure compensator to 3600 PSI.
10. Tighten jamb nut, replace cap.
11. Shut down engine.
12. Remove pressure gauge.

    On machines with multiple pressure outputs in the cab, check pressure gauge against cab display for accuracy.



DIFFERENTIAL LOCK/SERVO VALVE PRESSURE ADJUSTMENT PROCEDURE

Servo Door Switch



New Style Switch **Old Style Switch**

1. Close the cab door to engage the servo.There are servo switches, one located in both doors. Adjustments cannot be made if the servo is disengaged.
2. Install pressure gauge on Pilot Supply Pressure Check Port (PS2) on the bottom of the Differential Lock/Servo Valve.
3. Start the engine and run just above an idle.
4. Turn ON the differential lock switch located on the instrument panel in the cab.
5. Loosen the Jamb Nut.
6. Adjust the Pressure Reducing Valve to 625 PSI.

Pressure Adjustment Screw

Standby/Compensator **Pilot/Differential Lock**

DO NOT EXCEED 625 PSI OR DAMAGE TO THE AXLE WILL OCCUR!!

7. Tighten Jamb Nut.
8. Turn OFF the differential lock switch located on the instrument panel in the cab.
9. Shut down engine.
10. Remove pressure gauge.

NOTE: With the differential lock switch in the cab disengaged, pressure will read 450 - 500 PSI (this is standby pressure for the Accessory Pump).

SAUER MULCHER PUMP CHARGE PRESSURE ADJUSTMENT PROCEDURE

NOTE: All following adjustment can be made using the Diagnostic Pressure Display in the cab. Make sure you are on the correct setting or that the pressure transducer is on the correct test port when making adjustments. Pressures are not affected by servo switches on cab doors.

1. Turn Dial to 4 on the Diagnostic Pressure Display or install pressure gauge on Mulcher pump forward test port.

2. Start engine, run at full throttle. Mulcher pressure is directly affected by engine speed, if the pressures are set at a low engine speed, your pressure could exceed the capacity of the mulcher head and full engine speed. Make sure the mulcher attachment is not running.

3. Loosen jamb nut on charge pressure set screw.

4. Adjust charge pressure set screw to between 300-400 PSI. Adjustments can be made with machine off to keep components cooler.

5. Tighten jamb nut.

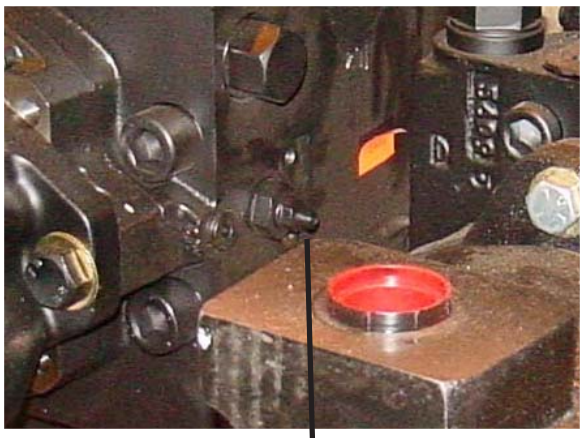
6. Shut down engine.

7. Remove pressure gauge.

DIAGNOSTIC PRESSURES
1 - PILOT / DIFF LOCK
2 - ACC PUMP COMP
3 - ACC PUMP LDSNS
4 - ATTACH PUMP ACC
5 - ATTACH PUMP BRAKE
6 - DRIVE PUMP FWD
7 - DRIVE PUMP REV
8 - FLOAT PRESSURE
PSI
DIAGNOSTIC PRESSURE SETTING

Multi-Pressure Transducer Assembly

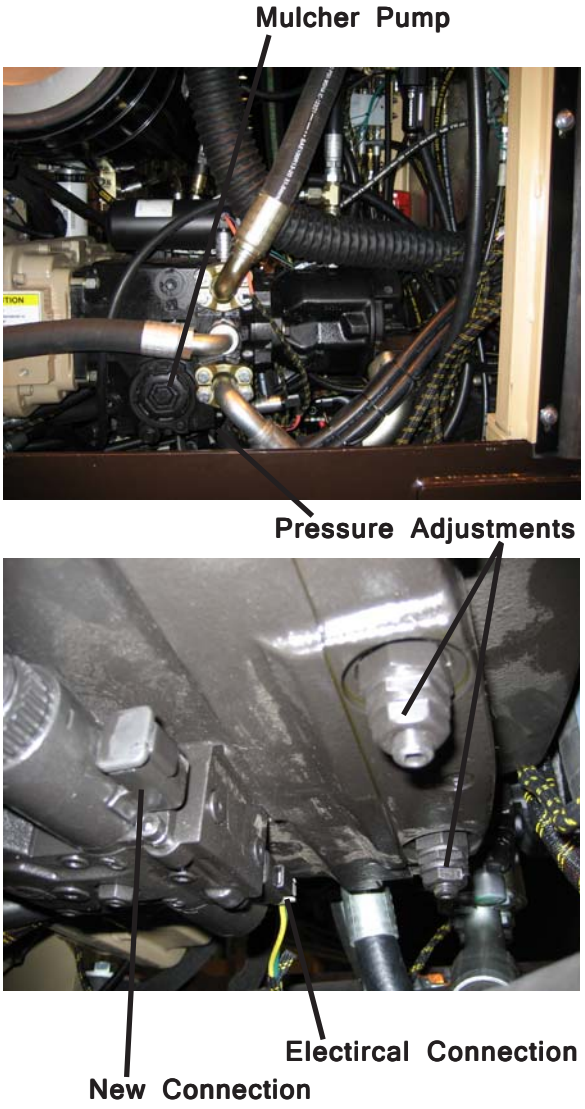
Single Pressure Transducer Assembly



Charge Pressure Adjustments

SAUER MULCHER PUMP PRESSURE ADJUSTMENT PROCEDURE

1. Turn Dial to 4 on the Diagnostic Pressure Display or install pressure gauge on Mulcher pump acceleration test port.
2. Immobilized mulcher drum or cap off mulcher pressure and return lines.
3. Start engine, run at full throttle.
4. Turn mulcher switch to ON position.
5. Loosen jamb nut on pump acceleration adjustment. Adjustments for the Sauer Pump are located on the bottom of the pump. Adjustments can be made with machine off to keep components cooler.
6. Adjust acceleration pressure set screw to 4800 PSI. Acceleration pressure is the set screw farthest from the outside of the machine.
7. Tighten jamb nut.
8. Turn mulcher switch to off position.
9. Shut down engine.
10. Swap the electric wire to the other side of the pump controller located on bottom side of pump.
11. Turn Dial to 5 on the Diagnostic Pressure Display or install pressure gauge on Mulcher pump braking test port.
12. Start engine, run at full throttle.
13. Turn mulcher switch to ON position.
14. Loosen jamb nut.
    WARNING Brake line heats up fast and can burn you.
15. Adjust braking pressure set screw to 2500 PSI. If pressure is set higher than this the belts in the mulcher can be burn up. Braking pressure is the set screw closest to the outside of the machine.
16. Tighten jamb nut.
17. Turn mulcher switch to off position.
18. Shut down engine.
19. Return electric wire back to original position.
20. Reconnect mulcher hoses or free mulcher drum.
21. Remove pressure gauge.



REXROTH DRIVE PUMP CHARGE PRESSURE ADJUSTMENT PROCEDURE

1. Turn Dial to 6 or 7 on the Diagnostic Pressure Display or install pressure gauge on Drive pump pressure test port.
2. Start engine, run at full throttle.
3. Loosen jamb nut on charge pressure relief.
4. Adjust charge pressure relief to between 450 - 500 PSI.
5. Tighten jamb nut.
6. Shut down engine.
7. Remove pressure gauge.

Charge Pressure Relief

REXROTH DRIVE PUMP PRESSURE ADJUSTMENT PROCEDURE

1. Turn Dial to 6 on the Diagnostic Pressure Display or install pressure gauge on Drive pump forward and reverse pressure test ports.
2. Switch parking brake ON.
3. Disconnect travel pump spool centering hose.
4. Cap and plug fittings.
   This allows pump to come on stroke with parking brake locked.
5. Start engine, run just above an Idle.
6. Shift transfer case into high range.
7. Depress travel pedal to pressurize forward travel.
   WARNING Watch to make sure machine is not moving before making adjustments.
8. Loosen jamb nut.
9. While watching the gauge, slowly adjust P.O.R. screw in (Clockwise) until engine starts to labor.
   This is the setting of the system relief valve. This pressure should be 5300-5400 PSI.
10. Return pressure to 5000 PSI.
11. Turn Dial to 7 on the Diagnostic Pressure Display, and repeat steps 7 - 10 for reverse process.
12. Tighten jamb nut.
13. Shut down engine.
14. Replace travel pump centering hose.

Centering Hose

P.O.R. Screw

Plug and Cap

NOTE: P.O.R. controls maximum system pressure in both directions.

SAUER DRIVE PUMP CHARGE PRESSURE ADJUSTMENT PROCEDURE

1. Install pressure gauge on Forward Pressure Test Port.
2. Start engine, run at full throttle.
3. Loosen jamb nut.
4. Adjust set screw. Charge pressure should be 450 PSI.
5. Tighten jamb nut.
6. Shut down engine.
7. Remove pressure gauge.

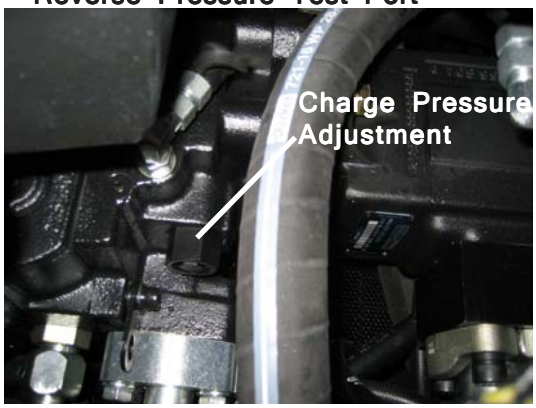
Note: Adjustments can be made to the set screw with engine off. To do this, check pressure, shut down the engine, adjust set screw, restart engine and check pressure. Repeat until pressure is correct.

SAUER DRIVE PUMP MAX PRESSURE ADJUSTMENT PROCEDURE

1. Install pressure gauge on Forward Pressure Test Port. (If you have the ability to view 2 pressures at once install the second gauge on the Reverse Pressure Test POrt now.)
2. Disconnect drive pump spool centering hose.
3. Cap and plug fittings. This allows pump to come on stroke with parking brake locked.
4. Start engine, run just above an Idle.
5. Engage parking brake.
6. Shift transfer case into high range.
7. Depress travel pedal to pressurize forward travel.
   WARNING Watch to make sure machine is not moving.
8. Loosen jamb nut on Forward Pressure Adjustment.
9. Slowly adjust Forward Pressure Adjustment screw until pressure gauge reads 5000 PSI.
10. Tighten jamb nut.
11. Shut down engine.
12. Repeat steps for Reverse Pressure Adjustment.
13. Remove pressure gauge.
14. Connect spool centering hose.

Forward Pressure Test Port

Reverse Pressure Test Port



Centering Hose

Forward Pressure Adjustment

Reverse Pressure Adjustment

REXROTH DRIVE MOTOR PRESSURE ADJUSTMENT PROCEDURE (HA CONTROL)

1. Install pressure gauge on the M port located on the drive motor.
2. Turn dial to 6 on the Diagnostic Pressure Display or install a second pressure gauge on G port.
3. Switch parking brake ON.
4. Switch low-lock to "OFF" position.
5. Disconnect travel pump spool centering hose. (Refer to Drive Pump Adjustment Procedure)
6. Cap and plug fittings. This allows pump to come on stroke with parking brake locked.
7. Start engine, run just above an idle.
8. Shift transfer case into high range.
9. Slowly depress travel pedal to gradually pressurize forward travel.
   WARNING Watch to make sure machine is not moving before making adjustments.
10. While watching pressure gauges and display, gauge on M port should read 0 PSI until you reach begin of shift pressure. When pressure begins to rise on the gauge located on the M port, the reading on the G port is the begin-of-stroke point.
11. Loosen jamb nut.
12. Adjust begin-of-stroke set screw to between 3800 - 4000 PSI. Turn screw in (clockwise) to lower begin-of-stroke point setting and out (counterclockwise) to raise begin-of-stroke point setting.
13. Tighten jamb nut.
14. Release travel pedal.
15. Repeat steps 9 thru 14 until required begin-of-stroke point setting is achieved and stable.
16. After obtaining desired setting, Shut down engine.
17. Replace travel pump centering hose.
18. Remove pressure gauges.

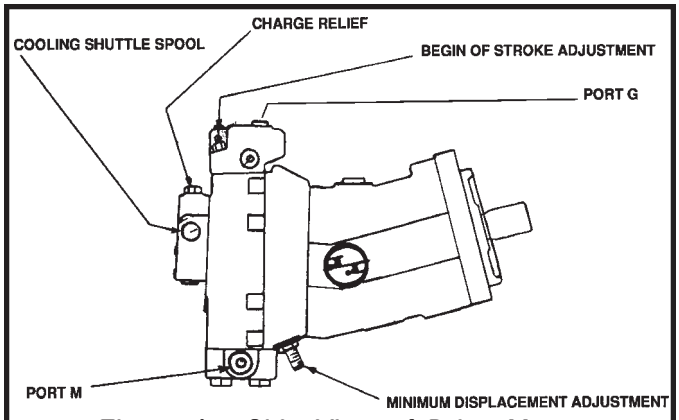
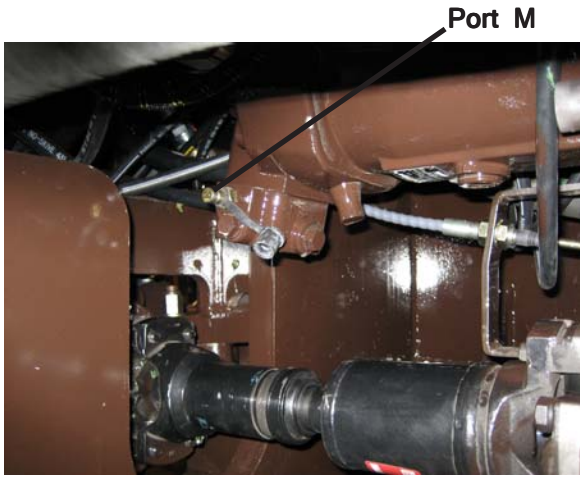
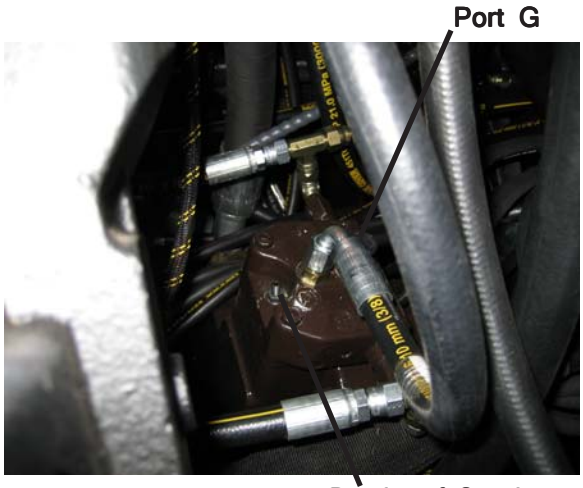


Figure 4 - Side View of Drive Motor



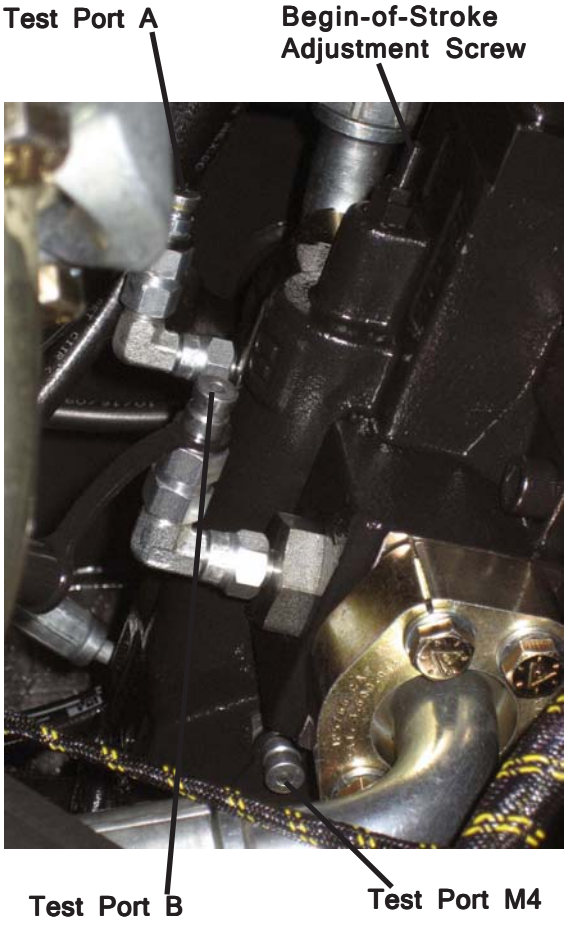


CAUTION

Ports may contain trapped pressure. Use care when removing gauges and installing plugs.

SAUER DRIVE MOTOR PRESSURE ADJUSTMENT PROCEDURE

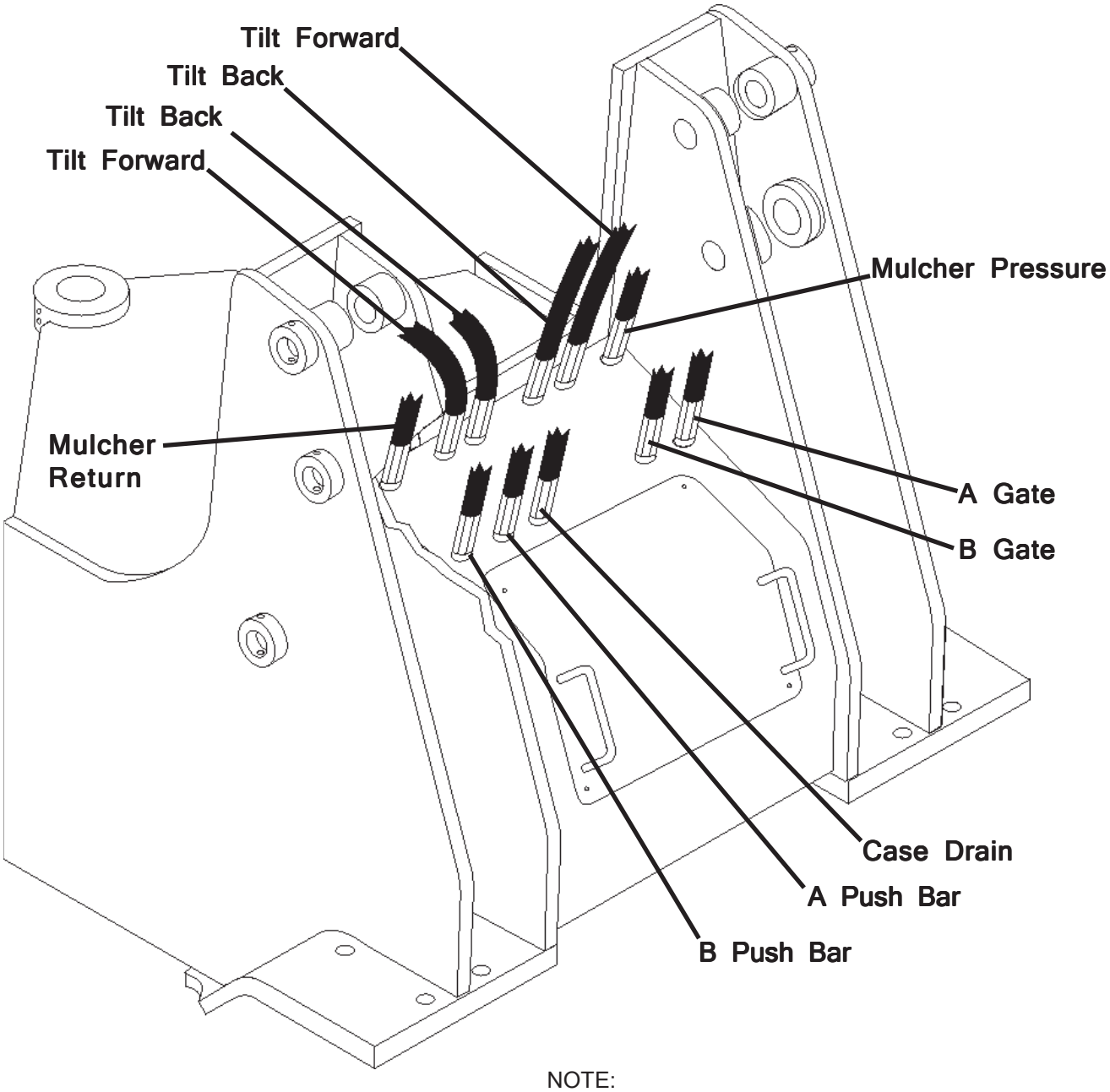
1. Install pressure gauge on Test Port A located on the drive motor.
2. Install a second pressure gauge on Test Port M4.
3. Switch parking brake ON.
4. Switch low-lock to "OFF" position.
5. Disconnect travel pump spool centering hose. (Refer to Drive Pump Adjustment Procedure)
6. Cap and plug fittings. This allows pump to come on stroke with parking brake locked.
7. Start engine, run just above an idle.
8. Shift transfer case into high range.
9. Slowly depress travel pedal to gradually pressurize forward travel. **WARNING Watch to make sure machine is not moving before making adjustments.**
10. While watching pressure gauges, gauge on Test Port M4 should read 0 PSI until you reach begin of shift pressure. When pressure begins to rise on the gauge located on Test Port M4, the reading on Test Port A is the begin-of-stroke point.
11. Loosen jamb nut.
12. Adjust begin-of-stroke set screw to between 3800 - 4000 PSI. Turn screw in (clockwise) to lower begin-of-stroke point setting and out (counterclockwise) to raise begin-of-stroke point setting.
13. Tighten jamb nut.
14. Release travel pedal.
15. Repeat steps 9 thru 14 until required begin-of-stroke point setting is achieved and stable.
16. After obtaining desired setting, Shut down engine.
17. Replace travel pump centering hose.
18. Remove pressure gauges.



⚠ CAUTION

Ports may contain trapped pressure. Use care when removing gauges and installing plugs.

HYDRAULIC HOSE HOOKUP (MULCHER)



NOTE:
Lift arms, lift cylinders and lift hoses are not shown.

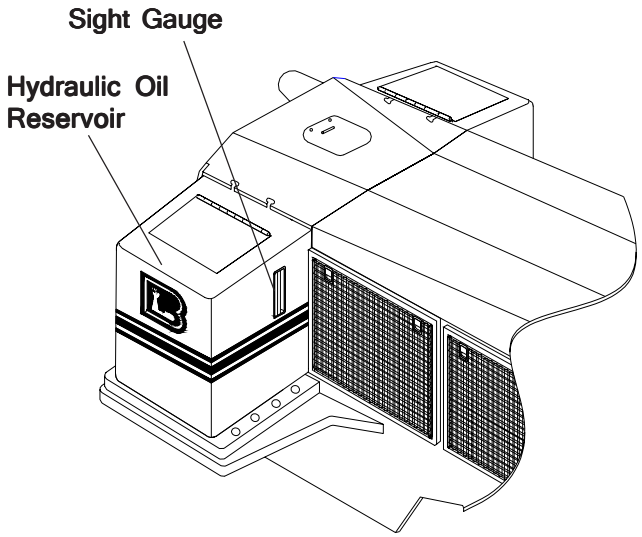
Lift hoses run from end of lift cylinders through cutouts in each side of front frame plate to valve bank.

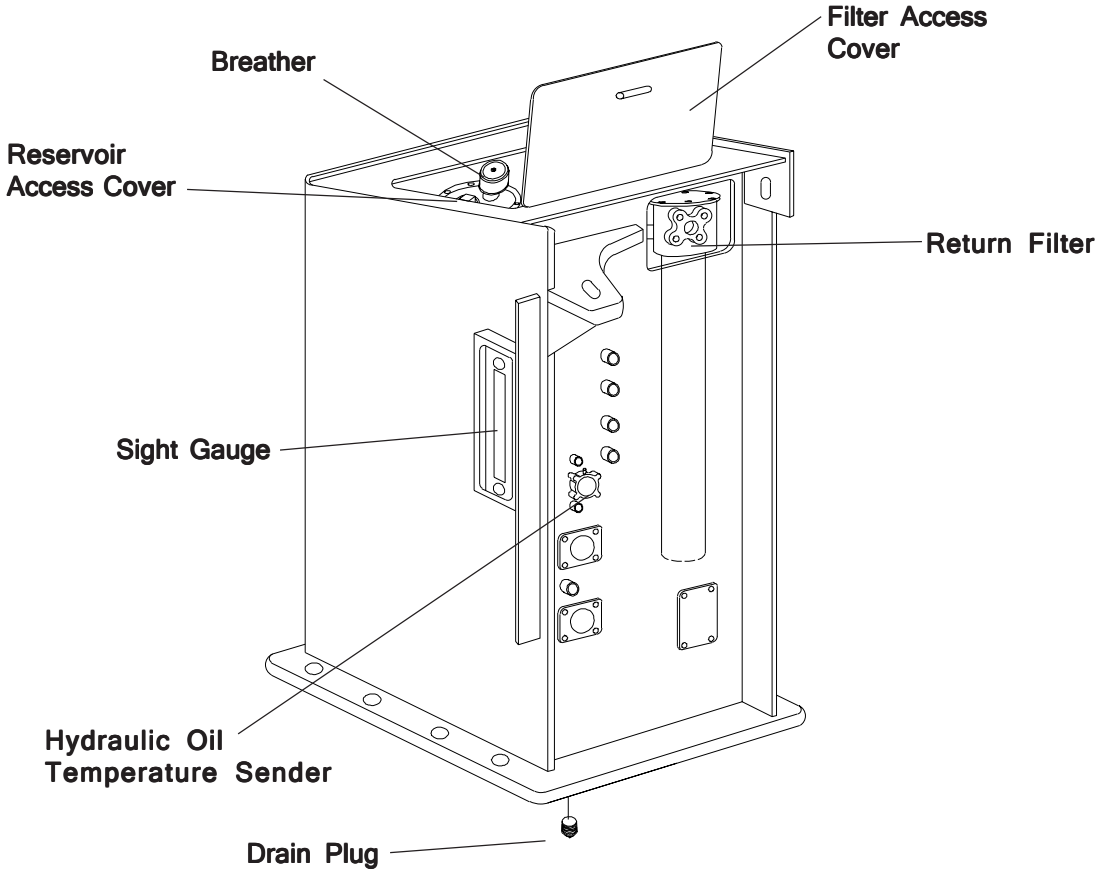
HYDRAULIC RESERVOIR MAINTENANCE

The hydraulic oil reservoir, is located on the rear of the frame on the right hand side. The reservoir features return line filters and suction screens to keep the oil clean. A sight gauge for checking oil level is located on the front of the reservoir.

⚠ CAUTION

When making repairs on hydraulic sytem, keep all parts clean and remove all dirt from the area before you begin disassembly. Use caps and plugs to keep dirt out of tubelines and openings.





Check oil level in reservoir before each period of operation, or daily. If, at any time, you find the level is low, check the machine for leaks around tubes, hoses, fittings, and couplings.

HYDRAULIC OIL CHANGING PROCEDURE

This procedure should be performed once during the breaking in period of a new loader (after one week, or 50 hours of operation) and then every six months, or 1000 hours.

Throughout the oil changing procedure remember that cleanliness is absolutely necessary. Hands, tools, pump, oil filling equipment, and, above all, the hydraulic oil itself must be kept absolutely clean. Dirt in the hydraulic system can cause serious damage to pumps, valves, and cylinders.

DRAINING THE RESERVOIR

1. First, be sure Mulcher attachment is lowered to the ground and secure, and machine is shut down.

2. Remove reservoir drain plug to drain hydraulic oil.

CLEANING THE RESERVOIR

1. Clean area around reservoir access cover on side of reservoir, and then remove access cover.

2. Remove all dirt and sediment from inside reservoir.

3. Clean the breather screen and check for damage. If damaged, replace the screen.

4. After everything in and around reservoir is completely clean, replace drain plug, and access cover.

5. Remove element from return filter and install a new one.

6. Remove element from hand pump filter and install a new one.

FILLING THE RESERVOIR

1. With drain plug in place and tightened, refill reservoir with recommended hydraulic oil (see Fuel and Lubricants section) using the hand pump .

2. Start engine, running it slowly until new hydraulic oil circulates throughout system.

3. With all control valves in neutral, run engine until pump quiets down, then add more hydraulic oil, if necessary.

4. Operate controls, adding more hydraulic oil as needed to maintain proper level in reservoir. This will work air out of system and help to prevent cavitation, which is caused by air bubbles in hydraulic oil as it passes through a pump.

5. Check hydraulic oil level again after machine has been operating for an hour or two.

HYDRAULIC OIL FILTER MAINTENANCE

A. THE "RETURN" FILTER

One Return Filter is used, and is located on top of the hydraulic oil reservoir. See Figure 1.

KEY TO CLEAN FLUIDS

Regular maintenance of filter elements is the key to clean fluid and long component life. Filters do not function when elements are clogged with contaminant to the point of bypass. Therefore, it its important to do three things:

1. Check the filter indicator frequently to determine when element needs servicing.
2. Make sure filter is fitted with correct replacement element. The correct replacement element should be listed on filter nameplate or see Parts Manual.
3. A periodic fluid sample of system should be analyzed.

SERVICING ELEMENTS

1. Shut down system and relieve all pressure in filter line.

2. Loosen screws on cover. Turn slightly to clear cover screws and remove cover. Allow excess fluid to drain.

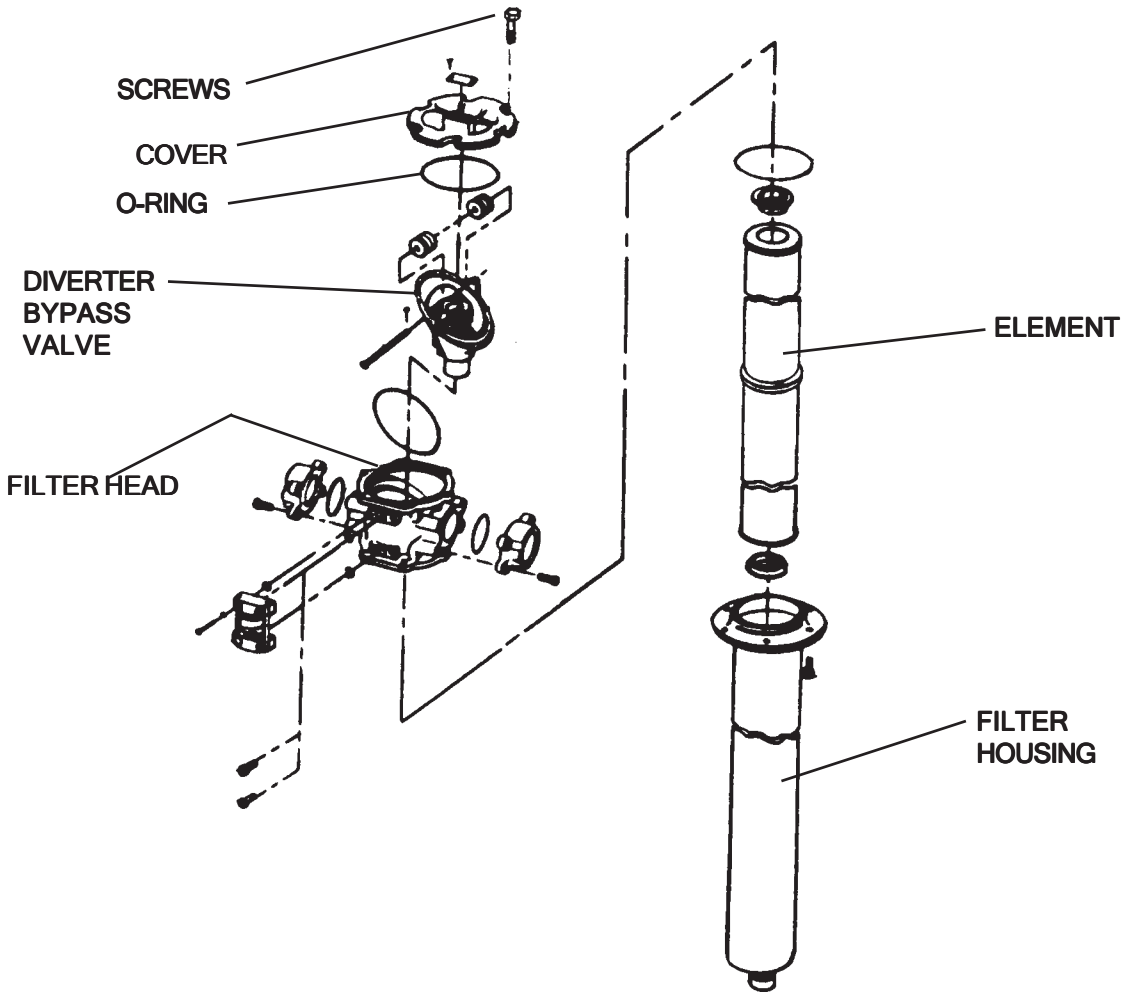


Figure 1

3. Remove diverter/bypass valve assembly.

4. Remove element from diverter/bypass valve assembly.

   A. Disposable Type: Replace element if a disposable paper or synthetic media is used. See next page.

B. Cleanable Type: Soak element in ultrasonic cleaner for fifteen minutes. If an ultrasonic cleaner is not available, soak in hot soapy water and ammonia solution for fifteen minutes. Swish around and blow dry from the outside in.

5. Replace element on diverter/bypass valve assembly and install in filter housing. Make sure that diverter o-ring seats properly into filter head.

6. Check to make sure notch on diverter/bypass valve assembly lines up with notch in filter head.

7. Inspect cover o-ring and replace it if necessary.

8. Replace cover and tighten screws until they are snug. Do not over tighten these screws.

FILTER ELEMENT REPLACEMENT INTERVALS
On new machine filter elements should be replaced after 50 hours of operation and then every 400 hours of operation after that.

B. THE SCREW-ON ELEMENT FILTERS - See Figure 2

These filters include the three drain filters (located behind the cab rear wall inside the shrouding) and the hand pump filter (located near the hand pump that is used to fill the hydraulic oil reservoir). They each contain a replaceable element. See Parts Manual for complete parts breakdowns.

CHANGING FILTER ELEMENT
1. Unscrew filter element from filter head.

2. Replace old element with new one. Hand tighten new filter element to filter head.

⚠ CAUTION
These filter elements are not re-usable.

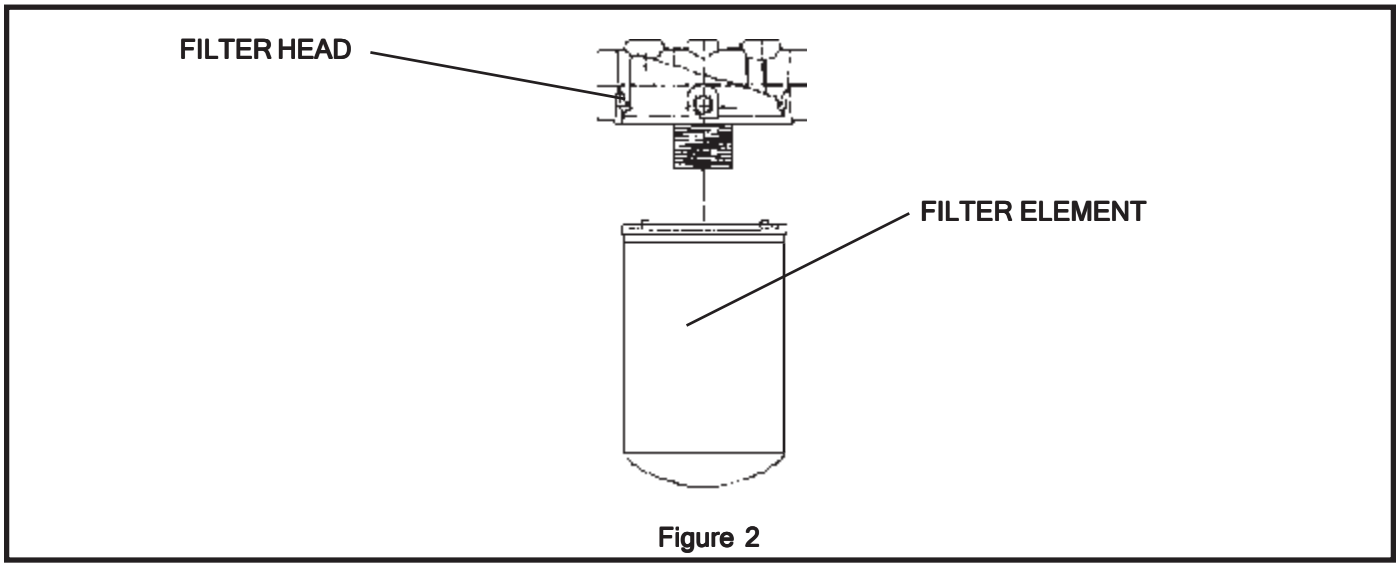


Figure 2

FILTER ELEMENT REPLACEMENT INTERVALS
On new machine filter elements should be replaced after 50 hours of operation and then every 400 hours of operation after that.

ELIMINATING AIR FROM THE SYTEM

All hydraulic fluid contains some dissolved air, usually about 10% by volume. Under increased pressure, the fluid will absorb much more air. Aeration in a hydraulic circuit is the presence of free air in places where there ought to be only fluid. Usually the air will be in the form of bubbles dispersed through the fluid.

Difficulties with aeration will occur more frequently as flow velocities increase in hydraulic components. This section covers some of the causes of air being introduced into a system and the suggested practices to effectively reduce and eliminate this problem.

CAUSES

The most common places for air to be introduced into a hydraulic system or for aeration to occur are listed below:

1. Damaged inlet line; loose or defective fittings or seals at any component.

2. Damaged return line; loose or defective fittings or seals at any component.

3. Damaged or worn cylinder rod, packing or seals.

4. Cracked junction blocks, tees or piping.

NOTE: Because fluid acts as a sealant at atmospheric pressure, when system drops below atmospheric pressure air may be drawn in where fluid will not necessarily leak out.

5. Fluid level too low. This can cause vortexing at pump inlet in reservoir, thus drawing in air.

6. Air trapped in filter with no means of bleed off.

7. Return fluid discharged above fluid level in reservoir. Poor baffling in the reservoir can also cause turbulence and resultant introduction of air.

8. Air trapped in system during original filling, or when adding fluid for makeup.

DAMAGE TO THE SYSTEM

The condition listed in the previous paragraph all contribute to inducing air into a hydraulic system. This aeration can cause jerky and uneven movement in pumps and motors, seizure, overheating, and possibly eventual failure.

HOW TO AVOID AERATION

Regular inspection and regular maintenance are the best ways to prevent air from being introduced into a hydraulic system. Keeping all connections and fittings tight is the easiest way to avoid the introduction of air.

Return fluid entering the reservoir will create aeration if it is discharged above the main body of the fluid in the tank. To prevent this condition, maintain sufficient fluid in the tank to keep the return line submerged. The pump intake line should always be below the fluid surface for the same reason.

Improved service life depends on maintaining proper conditions within the system.

HYDRAULIC FITTINGS, HOSES AND TUBING

A heavy wall tubing and multi-wire hose network carries the hydraulic oil from the reservoir to the pumps and valves and then to cylinders and motors and finally back to the reservoir.

Operating pressure of the hydraulic system varies from model to model. For your loader, consult the Hydraulic Pressure Warning Sheet in this manual.

Replace any tubelines which are bent or have become flat. There will be a restriction of fluid flow which will make hydraulic action slow and cause heat. Replace hoses which show signs of wear, damage, or weather-cracked rubber.

⚠ CAUTION

When making repairs on hydraulic system keep all parts clean and remove all dirt from the area before you begin disassembly. Use caps and plugs to keep dirt out of tubelines and openings.

PIPE THREAD SEALER

The main causes of air being introduced into a hydraulic system are loose connections and fittings. This not only creates aeration in the fluid but also provides the risk of contamination entering the fluid and components with the air. The easiest way to effectively reduce and possibly eliminate this problem is to use an adequate pipe thread sealer at all connections and fittings.

While other pipe thread sealers may meet specifications, the methods which Barko uses are Teflon tape, and Locktite Teflon Thread Sealer.

The sealer will form a flexible, non-hardening seal that can be easily broken at any time without stripping the threads or damaging the pipes or fittings. It will also provide a non-shrinking bond that will inhibit rust or corrosion in the threads and will not gall, seize, or block the threads.

APPLICATION

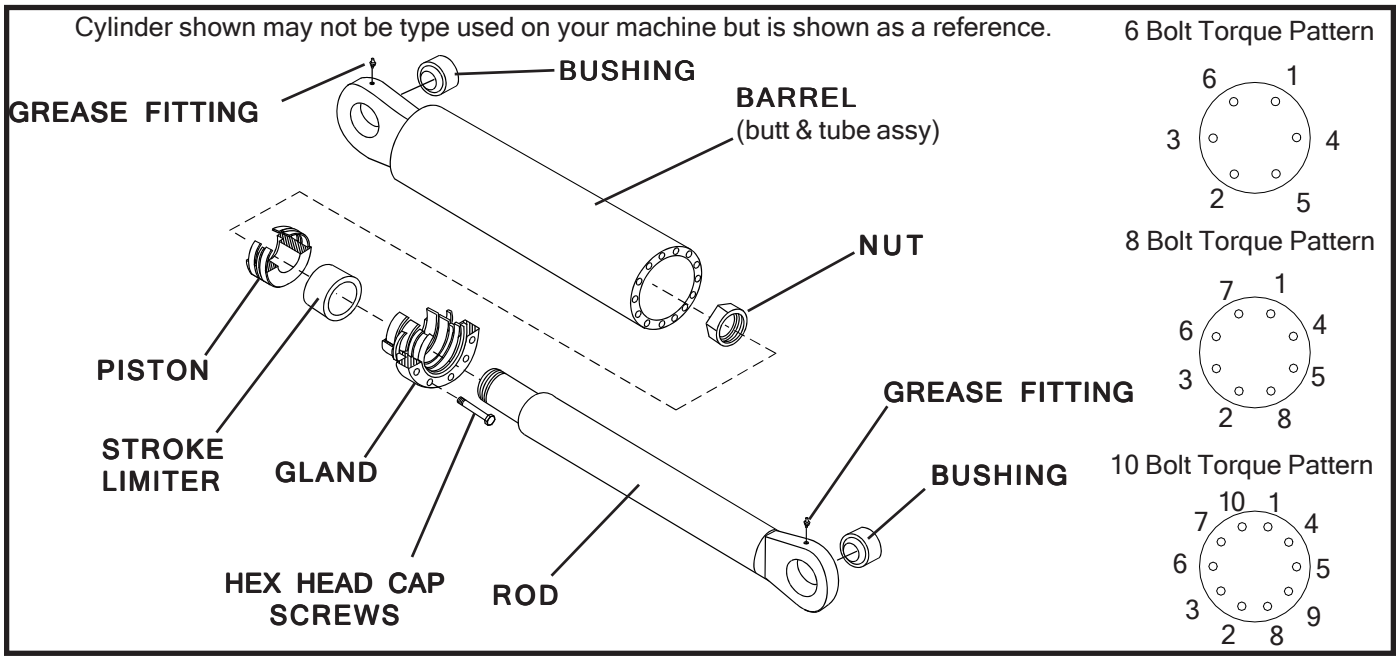
The pipe thread sealer is intended for use on threaded steel pipe in fixed installations. It can be easily applied by the tube it comes in. This sealer is intended for use with petroleum fluids only. Apply sealer sparingly and leave the first two threads near the end of the pipe or fitting bare.

Barko recommends the use of pipe thread sealer on all exterior pipe plug threads and pipe fittings.

HYDRAULIC CYLINDER MAINTENANCE

Hydraulic cylinders provide force used to operate booms, attachment, and stabilizers. Proper maintenance of cylinders will promote long life and smooth operation.

Inspect cylinders daily for leaks or damage and repair or replace as necessary. Lubricate cylinder grease fittings daily.

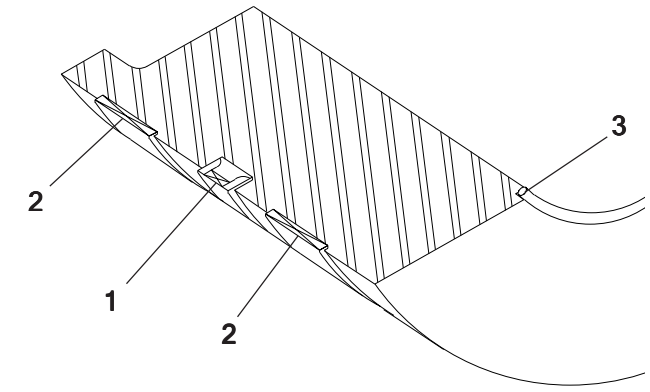


SEAL SERVICING

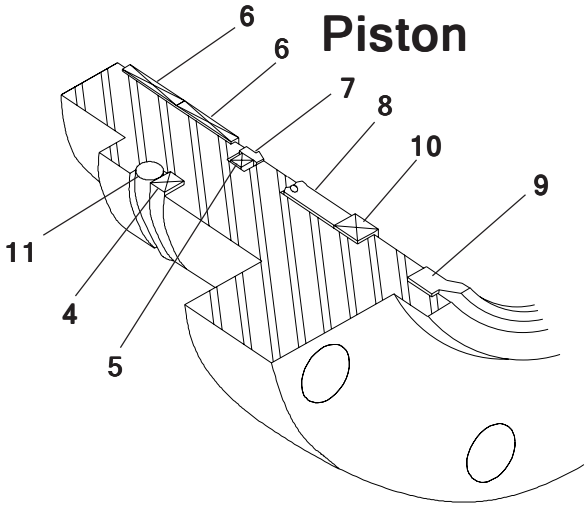
1. Remove cylinder from the machine.
2. Remove the bolts/screws from the gland.
   NOTE: Some cylinders have screw-on gland caps, held in place with an allen head set screw. If so, remove set screw and then removing gland cap using an adjustable chain wrench.
3. Remove hydraulic supply and return lines (including load lock valves if applicable) from cylinder to allow free movement of rod.
4. Remove rod assembly from the cylinder barrel.
5. Unscrew the nut from the piston end of the rod and remove the piston and gland.
6. Before removing old seals, note position they are in for proper reassembly (see diagram on next page).
7. Clean and inspect all parts. If worn or damaged, replace them.
8. Install new seals, ensure order is as shown in diagram.
   NOTE: Special pliers (part number 412-00409) can be used to aid in assembly (see photo on next page).
   Install item # 10 before item # 8.
   Heating item # 10, 7, and the stiff portion of # 1 in a 200° oven for 5 minutes will make it more pliable.
   Some kits may contain extra seals.
   When installing the wear rings, items # 2 & 6, put the cuts on opposite sides.
9. Start gland on rod and hammer on until it is past the stub.
10. Slide piston onto stub, ensure O-ring # 3 is on stub and piston is in proper orientation (small recess is O-ring side, large recess is nut side).
11. Tighten nut to torque listed in parts manual.
12. Oil new cylinder seals lightly before installing rod assembly in cylinder barrel, oil barrel if necessary.
13. Reinstall gland cap, tighten bolts in a cross pattern to torque specified in parts manual.
14. Reinstall on machine and reattach hydraulics lines.

NOTE: The more common cylinders use the following tool sizes:
Hex head cap screws require 15/16" wrench.
Nut requires 3-1/8" wrench.

Piston and Gland shown may not be type used on your machine but are shown as a reference.



Piston



Gland

NOTE: Follow order and orientation of seals shown in drawing. Expansion ring on item 8 must point towards pressurized end of cylinder with item 10 behind it. Depending upon manufacture date item 5 and 7 may be on either side of item 6

ITEM NO.	DESCRIPTION	QTY.
1	SEAL-PISTON	1
2	WEAR RING	2
3	O-RING	1
4	BACK-UP RING	1
5	SQUARE RING ROD BUFFER	1
6	WEAR RING	2
7	SEAL	1
8	SEAL ROD DEEP	1
9	WIPER	1
10	MODULAR BACKUP RING	1
11	O-RING	1

SEAL PLIERS (PART # 412-00409) BEING USED TO BEND SEAL FOR INSTALLATION.

AXLE MAINTENANCE (JOHN DEERE)

LUBRICANTS

DIFFERENTIAL OIL TYPES - See Figure 1.

The choice of oil used in the axle assembly is of utmost importance to reduce the tendency for wet disk brakes to chatter under severe applications. For the best durability and operation, John Deere Hy-Gard Transmission and Hydraulic Oils should be used. Hy-Gard is a mineral-based oil with special additives for wet disk brakes. These oils are formulated to reduce gear and bearing wear, reduce brake noise, reduce foaming, and maintain brake capacity and torque. Use of other oils may compromise one or more of those properties with less than desirable results. NEVER use a hydraulic brake fluid (SAE J70) of the type commonly used in automotive applications. Seals used at each brake piston use rubber compounds which are incompatible with this fluid and rapid deterioration of these packings is very likely to occur if such fluid is used. Alternative lubricants are available (such as Amoco 1000 Transmission/Hydraulic Oil). Consult your dealer if you have a special situation.

Depending upon the expected air temperature range between oil changes, use oil viscosity shown in Figure 1.

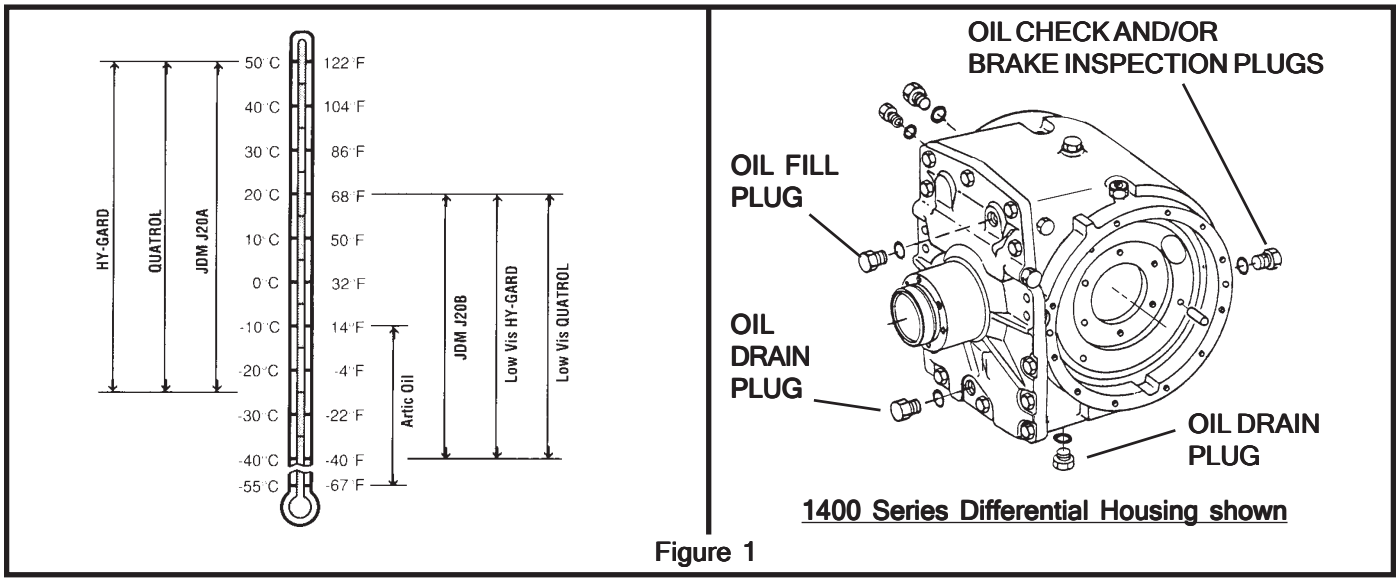


Figure 1

CHECKING THE DIFFERENTIAL OIL LEVEL - See Figure 1.

1. Remove differential oil check plugs. Oil level is correct when a few drops of oil flow out of the check hole.

2. Add oil if needed.

NOTE: The differential housing has three sumps connected by only a small hole. Fill the case slowly to allow oil to drain into all sumps. Confirm the oil level after allowing time for oil to flow into all compartments.

CHANGING THE DIFFERENTIAL OIL

1. Remove oil drain plug(s) and drain oil. Reinsert drain plugs.

2. Add oil. The oil volumes are as follows:

1200 Series - 20 quarts (18.9 L)	1600 Series - 48 quarts (45.5 L)
1400 Series - 30 quarts (28.4 L)	1800 Series - 33 quarts (31.5 L)

NOTE: The differential housing has three sumps connected by only a small hole. Fill the case slowly to allow oil to drain into all sumps. Confirm the oil level after allowing time for oil to flow into all compartments.

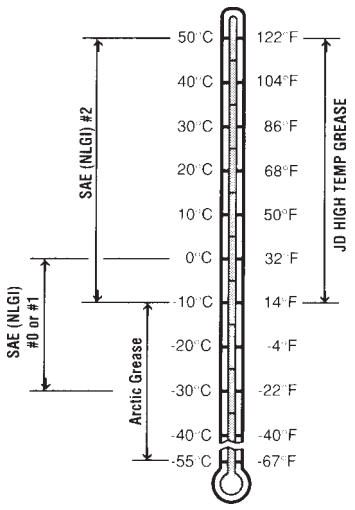
3. Check differential oil level:
   Remove the differential oil check plugs. The oil level should be slightly above the check hole.

GREASE - See Figure 2.
Depending on the expected air temperature range during use, use grease shown on chart in Figure 2.

Greases recommended are:

- John Deere Moly High Temperature/EP grease (preferred)
- SAE Multipurpose Grease with Extreme Pressure (EP) performance and containing 3 to 5 per cent molybdenum disulfide (preferred).
- Grease meeting MIL-G 10924C specifications may be used as arctic grease.

NOTE: Grease areas until grease flows out past the outer seal. A low pressure hand grease gun is preferred rather than a power grease gun to prevent overgreasing and possible seal damage.



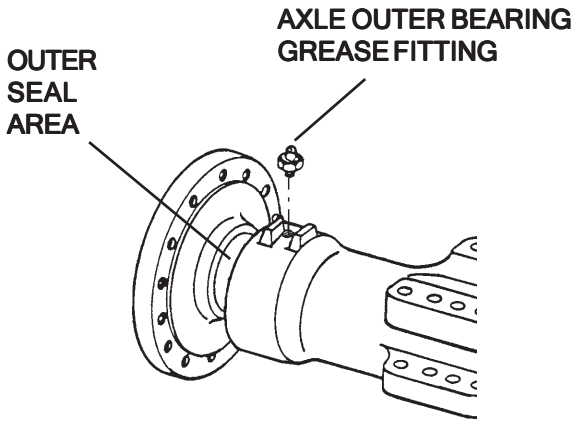


Figure 3

BRAKE OPERATING OIL
The same oil used to fill the axle differential assembly should also be used as the brake fluid. The choice of oil used is of utmost importance to reduce the tendency for wet disk brakes to chatter under severe applications. For the best durability and operation, John Deere Hy-Gard Transmission and Hydraulic Oils should be used. Hy-Gard is a mineral-based oil with special additives for wet disk brakes. These oils are formulated to reduce gear and bearing wear, reduce brake noise, reduce foaming, and maintain brake capacity and torque. Use of other oils may compromise one or more of those properties with less than desirable results. NEVER use a hydraulic brake fluid (SAE J70) of the type commonly used in automotive applications. Seals used at each brake piston use rubber compounds which are incompatible with this fluid and rapid deterioration of these packings is very likely to occur if such fluid is used.

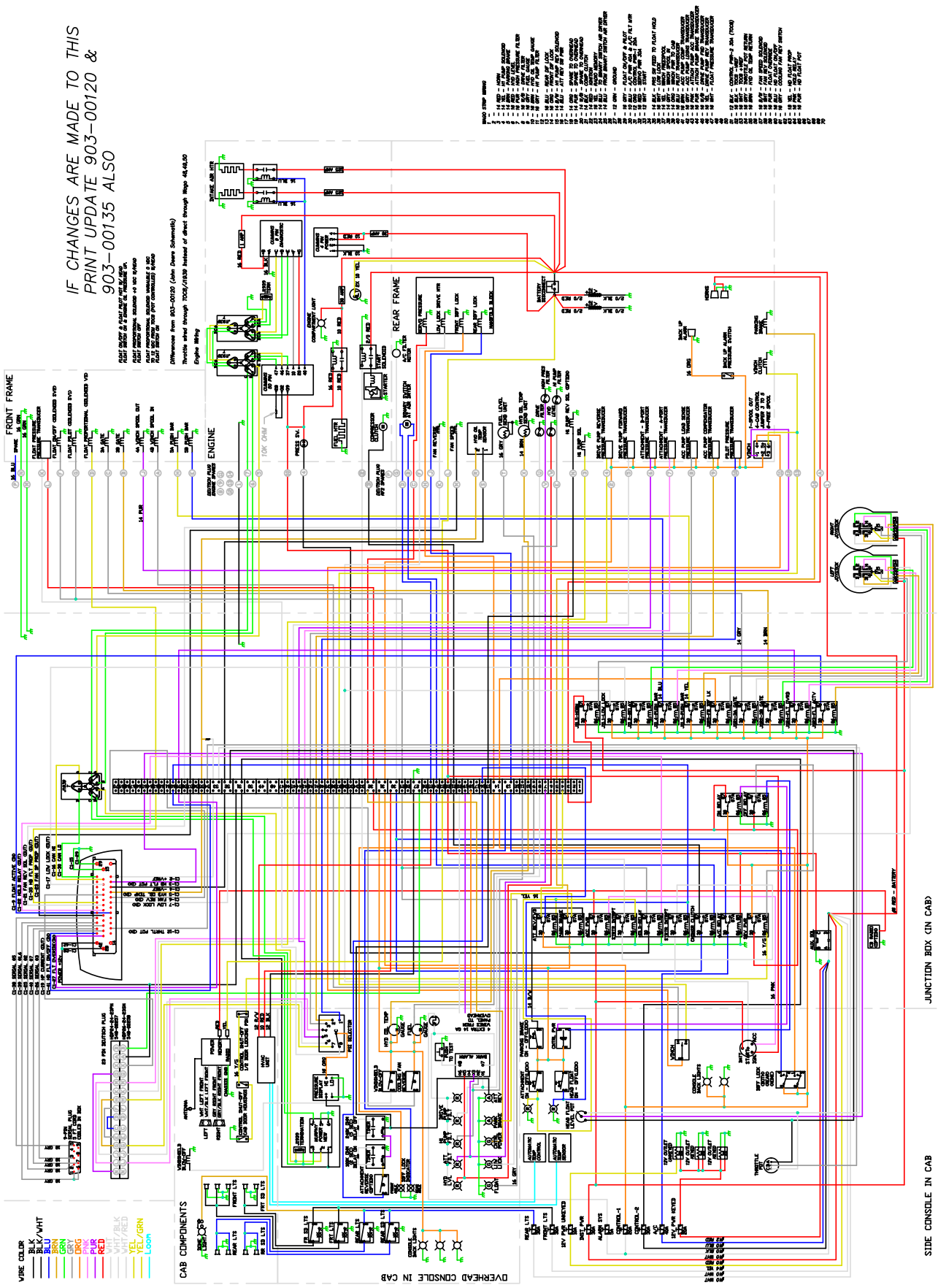
C. ELECTRICAL SYSTEM

ELECTRICAL SCHEMATIC

(CUMMINS ENGINE)

903-00122

903-00122 Replaced by 903-00140 Starting 8/20/07

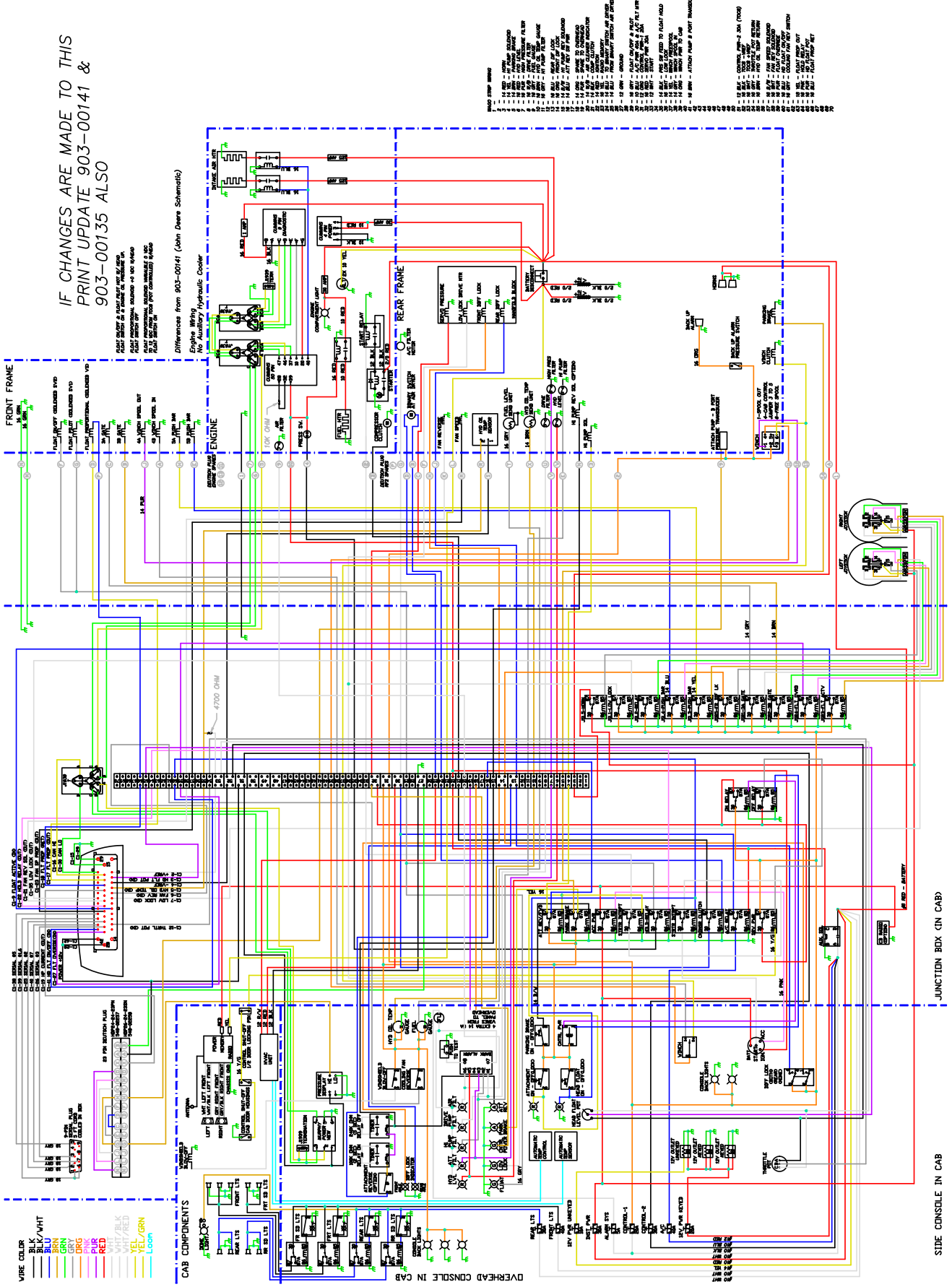


ELECTRICAL SCHEMATIC

(CUMMINS ENGINE)

903-00140

903-00122 Replaced by 903-00140 Starting 8/20/07

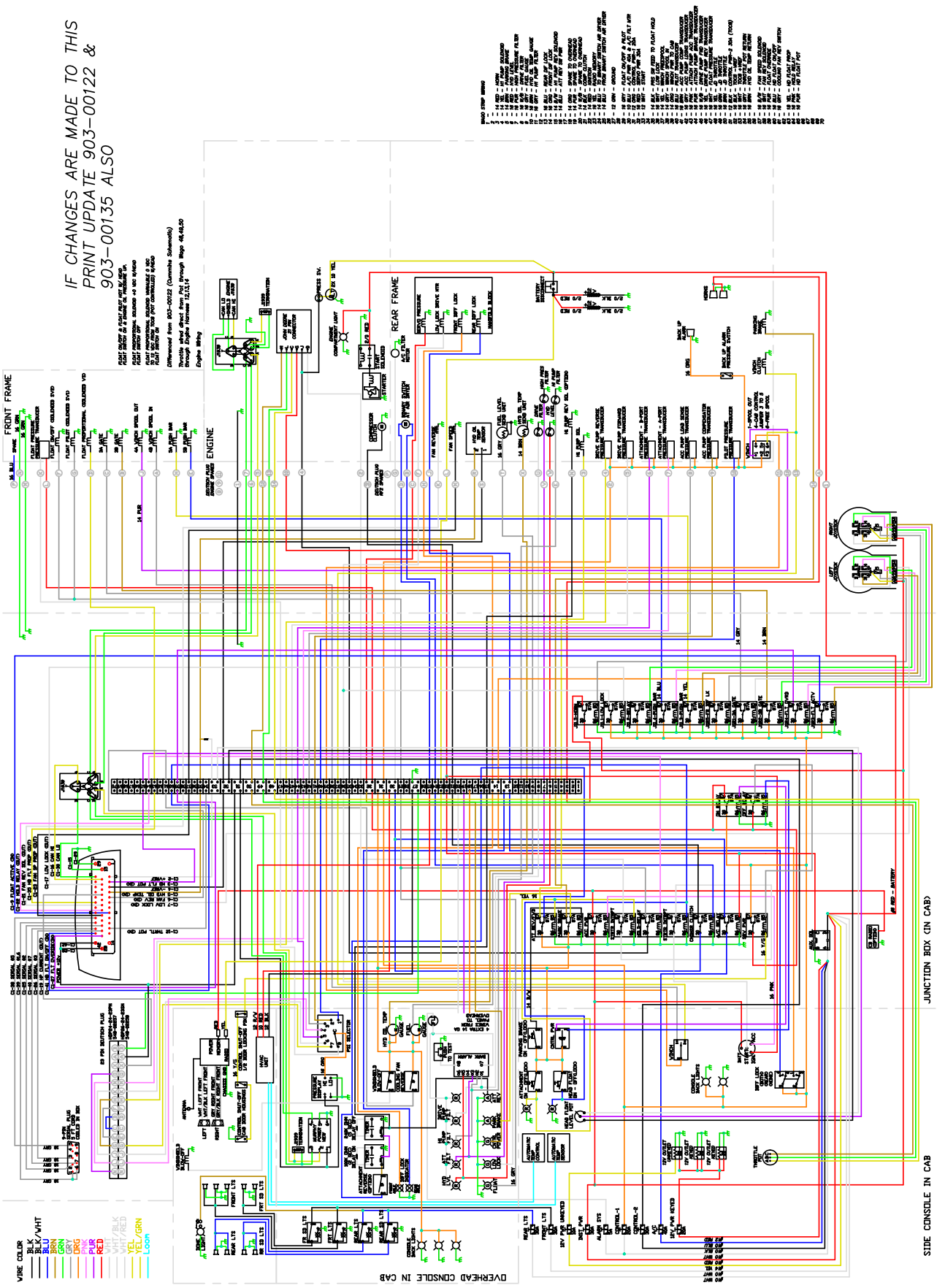


ELECTRICAL SCHEMATIC

(JOHN DEERE ENGINE)

903-00120

903-00120 Replaced by 903-00141 Starting 8/20/07

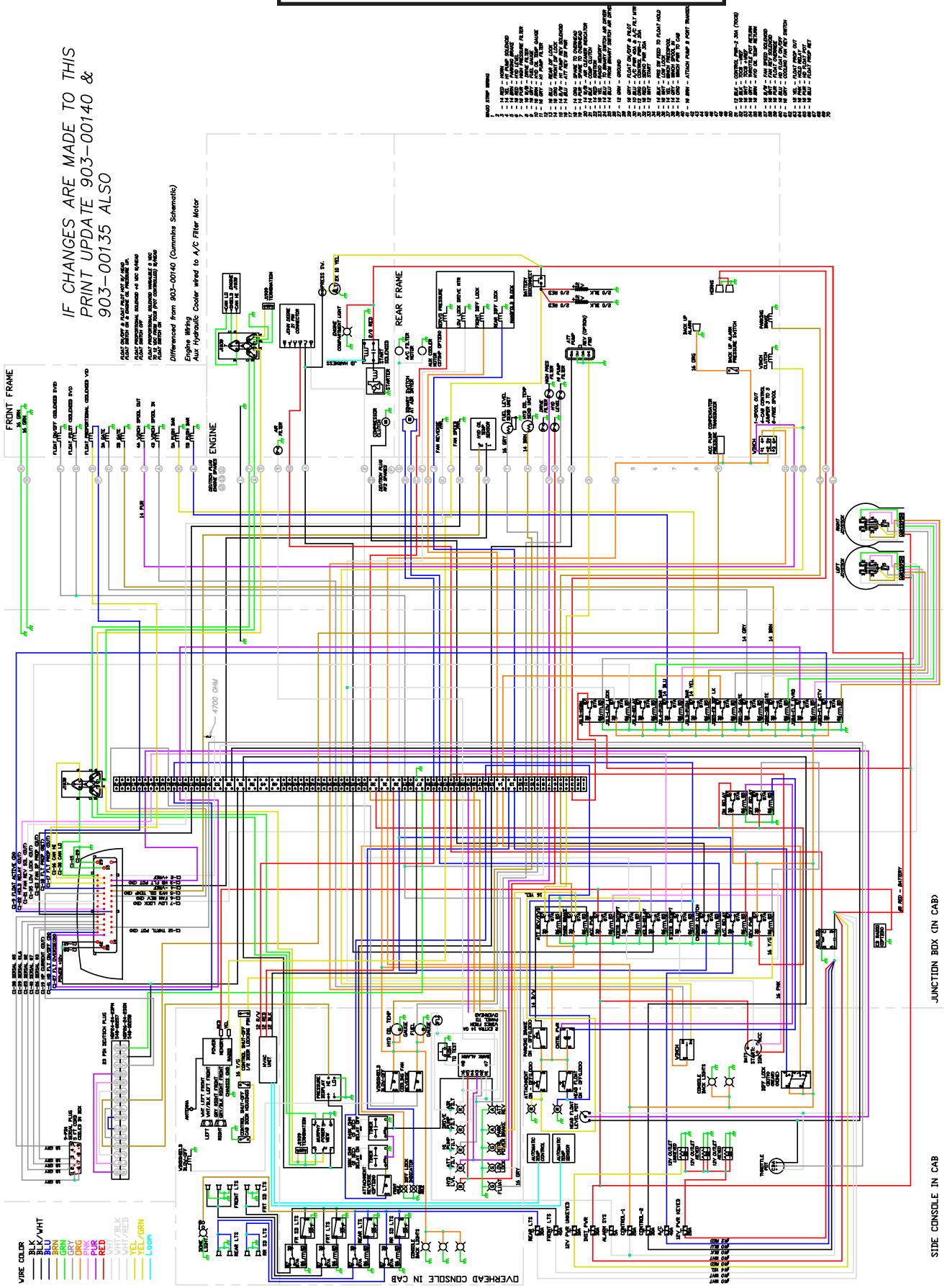


ELECTRICAL SCHEMATIC

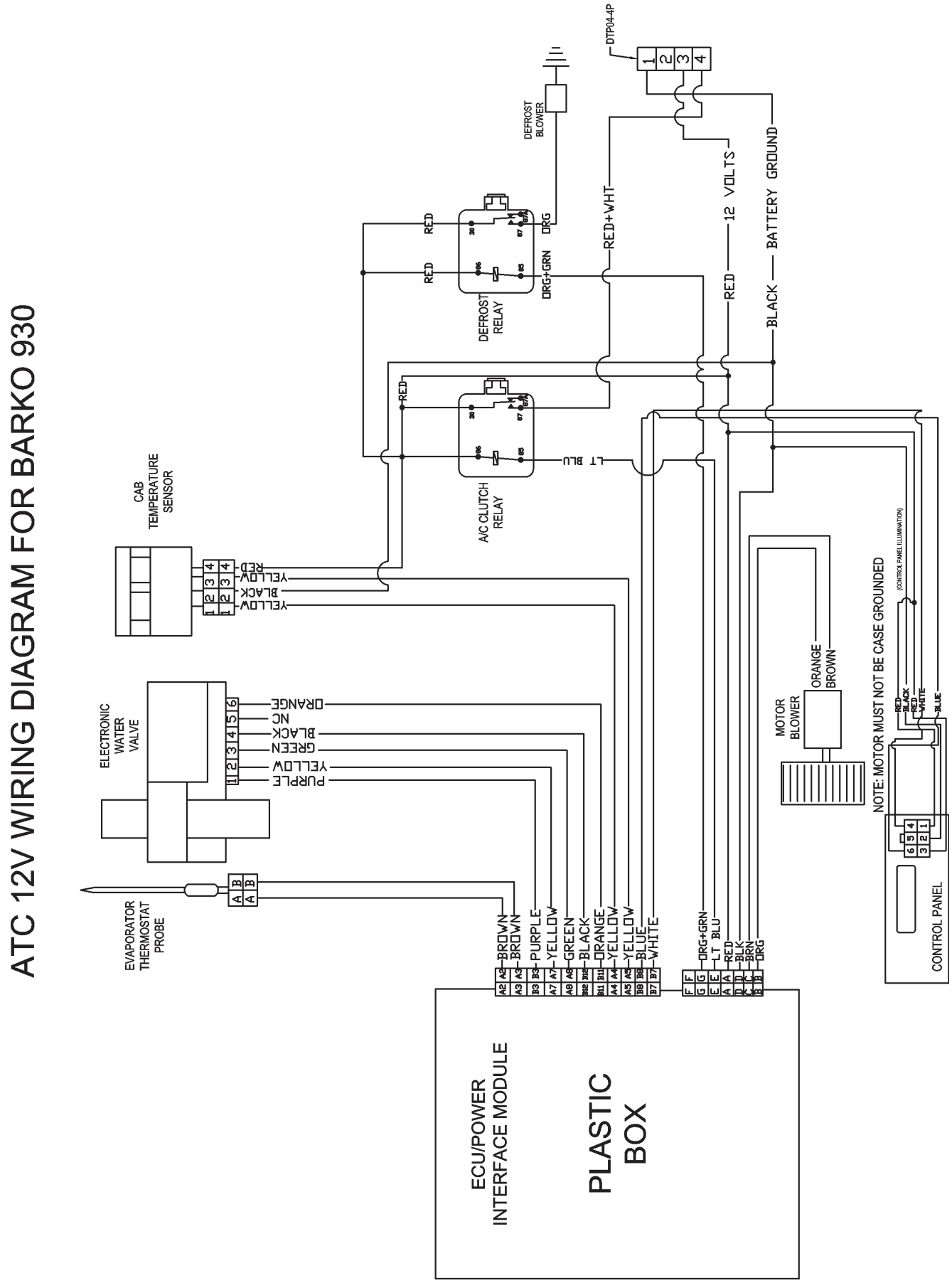
(JOHN DEERE ENGINE)

903-00141

903-00120 Replaced by 903-00141 Starting 8/20/07

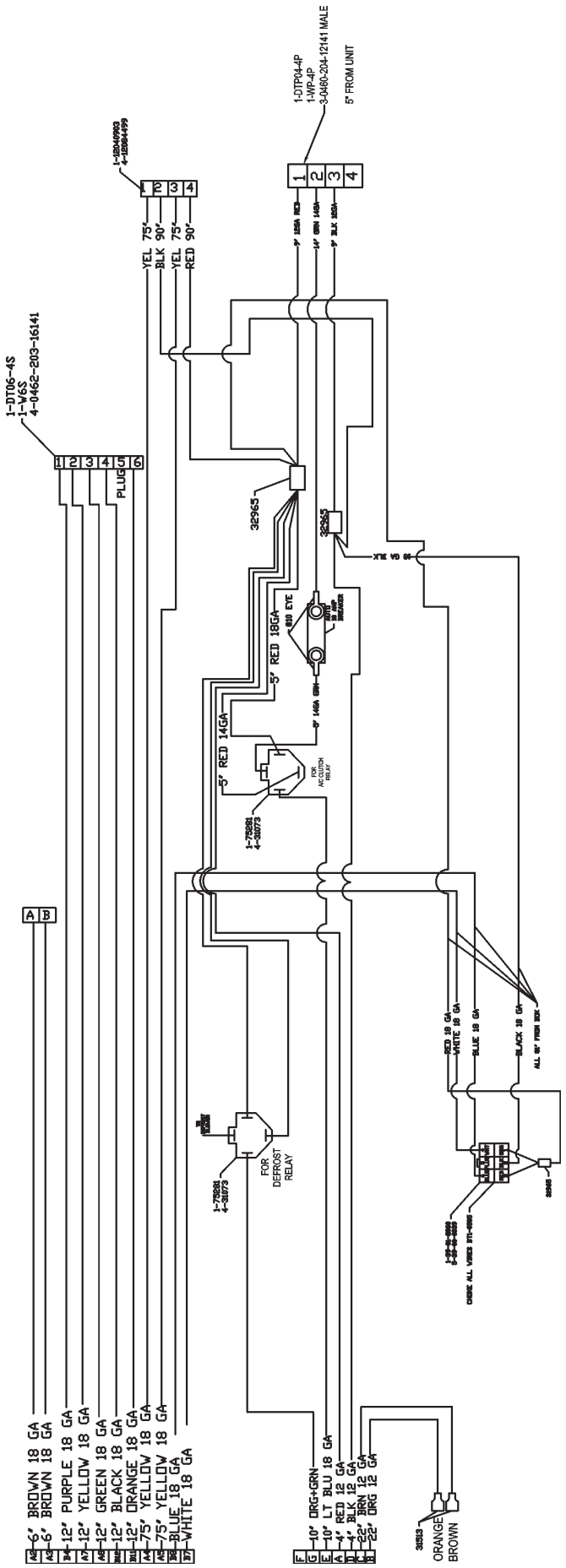


HEATER-AIR CONDITIONER ELECTRICAL SCHEMATIC



HEATER-AIR CONDITIONER ELECTRICAL SCHEMATIC

ATC 12V WIRING HARNESS FOR BARKO 930



ELECTRICAL SYSTEM MAINTENANCE

ELECTRICAL SYSTEM DESCRIPTION

This machine has 12 Volt electrical system with alternator, negative ground, and 12 Volt battery.

There are two basic circuits in the electrical system:

1. Charging circuit (alternator and battery).
2. Starting circuit (switch, solenoid, battery, and starter).

NOTE: Disconnect battery ground cable before making any repairs to electrical circuits.

In addition to the two basic circuits, there is an accessories circuit and operating light circuit(s).

ELECTRICAL SYSTEM INSPECTION

Check for:

- Clean and tight battery cables. Be sure all cables are clean and tight. Remove any acid or corrosion from battery cables with baking soda and water solution. Cover terminals with grease to prevent corrosion.

- Proper tension on drive belt for alternator. For drive belt adjustment, see ALTERNATOR DRIVE BELT ADJUSTMENT information.

- Loose wire connections. Be sure all wires are tightly connected.

- Broken or open wires. Replace any wires that are damaged or worn.

- Proper electrolyte level in battery. Add distilled water if necessary.

- Proper voltage of battery. Charge if necessary.

NOTE: See Electrical Schematic in Parts Manual under ELECTRICAL section for complete electrical system.

USING AN EXTRA BATTERY TO START MACHINE

If necessary to use an extra battery and "jumper" cables to start engine, be careful. This is a two-person operation. There must be one person in operator's seat and one person to connect and disconnect battery cables.

⚠ WARNING

Lead-acid batteries produce flammable and explosive gases. Keep arcs, sparks, flames and lighted tobacco away from battery. An explosion may occur if these warnings are not followed.

1. Make sure ignition is in "OFF" position.

2. Be sure battery to be used is of same voltage as battery in machine.

3. Battery terminals have identification marks. Positive terminal is marked (+) and negative terminal is marked (-).

⚠ WARNING

When using an extra battery to "jump" start an engine, make connections in order given in this manual.

⚠ WARNING

Do not touch battery terminals with any metal or allow jumper cable ends to touch each other. Sparks may occur, causing damage to battery and personal injury.

4. Be sure negative terminal (-) of battery is connected to engine with negative battery cable.

5. Connect end of first jumper cable to positive terminal (+) of extra battery. Connect other end of same jumper cable to positive terminal (+) of machine battery.

6. Connect end of second jumper cable to negative terminal (-) of extra battery. Connect other end of second jumper cable to a metal part of engine.

DO NOT connect last jumper cable end directly to negative terminal (-) of machine battery. This can cause spark to destroy battery and cause personal injury should battery explode. Connect last jumper cable to a metal part of engine.

⚠ WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body. In case of battery acid contact, wash immediately with water and seek immediate medical attention.

7. Check to be sure cables are away from fans and belts.

8. Start machine engine.

9. After engine starts, remove negative jumper cable connected to engine FIRST.

10. Next remove jumper cable from machine battery positive (+) terminal.

11. Then remove jumper cables from extra battery.

⚠ WARNING

Do not jump start or charge a frozen battery. Warm battery to 60 degrees F (16 degrees C) before connecting to a charger. Unplug charger before connecting or disconnecting cables at battery. Battery gas can explode and cause serious injury.

INSTALLING A NEW BATTERY

1. Remove battery cables. Remember position of positive terminal and negative terminal so you can connect them again correctly.

2. Remove battery hold-down bar. Remove battery from compartment.

3. Clean terminal posts of new battery and cable connections with wire brush.

4. Install new battery in compartment. Install hold-down bar.

5. Install and tighten battery cables. Connect negative cable last to prevent sparks.

⚠ WARNING

Do not touch battery terminals with any metal. Sparks may occur, causing damage to battery and personal injury.

ALTERNATOR DRIVE BELT ADJUSTMENT

1. Loosen alternator adjusting bolt and mounting bolt. See Figure 1.

2. Move alternator along adjustment bar to adjust tension of belt to have 1/2" movement at 10 pounds of pressure at center of belt.

3. Tighten alternator adjusting bolt and mounting bolt.

After a new drive belt has been installed, it will be necessary to adjust it after 8 hours of machine operation.

Adjusting Belt Tension

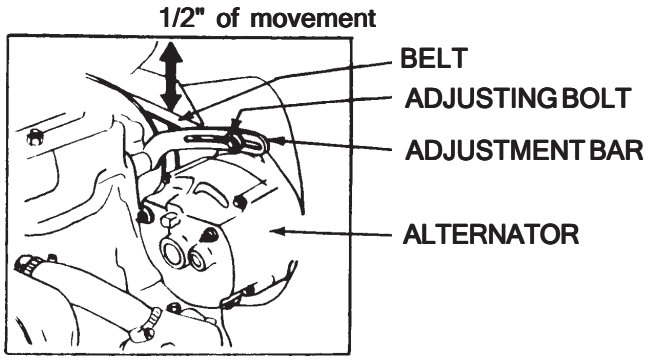


Figure 1

ALTERNATOR MAINTENANCE

CHECKING THE WIRING

1. Turn the starter switch on.

2. Connect a volt meter between the ground and: (See Figure 2.)

   a) the No. 1 alternator connector.
   b) the No. 2 alternator connector.
   c) the "BAT" connector.

Alternator

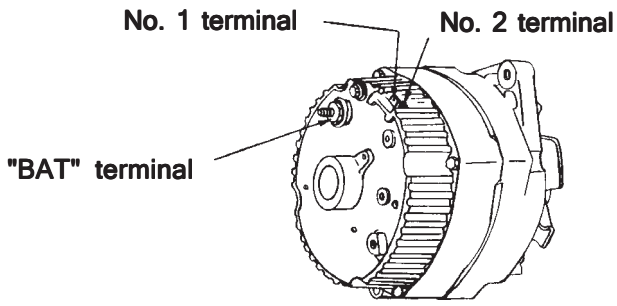


Figure 2

3. If any of these tests show zero voltage, repair or replace wiring.

4. Check voltage again until correct reading appears.

CHECKING ALTERNATOR OUTPUT

1. Disconnect negative battery cable.

2. Remove wire from "BAT" connector on alternator and fasten it to one connector of an ammeter. Fasten other connector of ammeter to "BAT" connector of alternator.

3. Connect battery cable again.

4. Remove hot wire from electric solenoid on fuel injection pump and turn engine with starter for approximately 30 seconds to cause a partial discharge of battery.

5. Install hot wire on electrical solenoid and start engine and run at full engine RPM.

6. The ammeter reading must be within 10 percent of rated amperage marked on alternator case.

7. If reading is correct, alternator is good. If reading is more or less than 10 percent of rated amperage, check regulator.

CHECKING THE REGULATOR

1. Use steps 1 through 5 of "Checking Alternator Output".

2. Put a small screwdriver in test hole. See Figure 3.

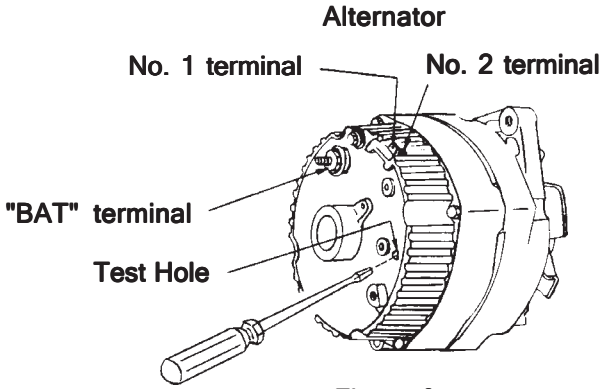


Figure 3

3. If the ammeter reading is not within 10 percent of rated amperage (marked on alternator case), regulator may be damaged. Check diode trio, rectifier, stator, or rotor.

Damage to alternator can occur if:

- battery connections are not connected properly.
- wires from alternator are grounded.
- engine is operated with battery cables disconnected.
- cables are connected when using a fast charger or when welding on the loader. (Remove both cables from the battery.)
- extra battery cables (booster cables) are connected wrong.

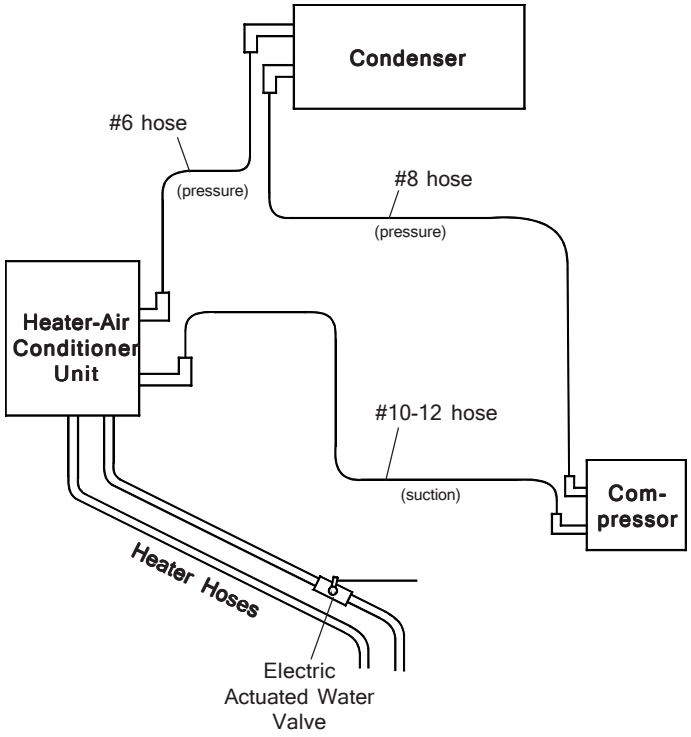
ELECTRICAL SYSTEM TROUBLE SHOOTING

The following trouble shooting chart is provided as an assistance in locating and correcting problems which are most common.

PROBLEM	CAUSE
Battery does not hold it's charge.	1,2,3,4,5
Alternator will not charge.	1,2,5
Starter will not turn the engine.	2,3,4,6,7,8

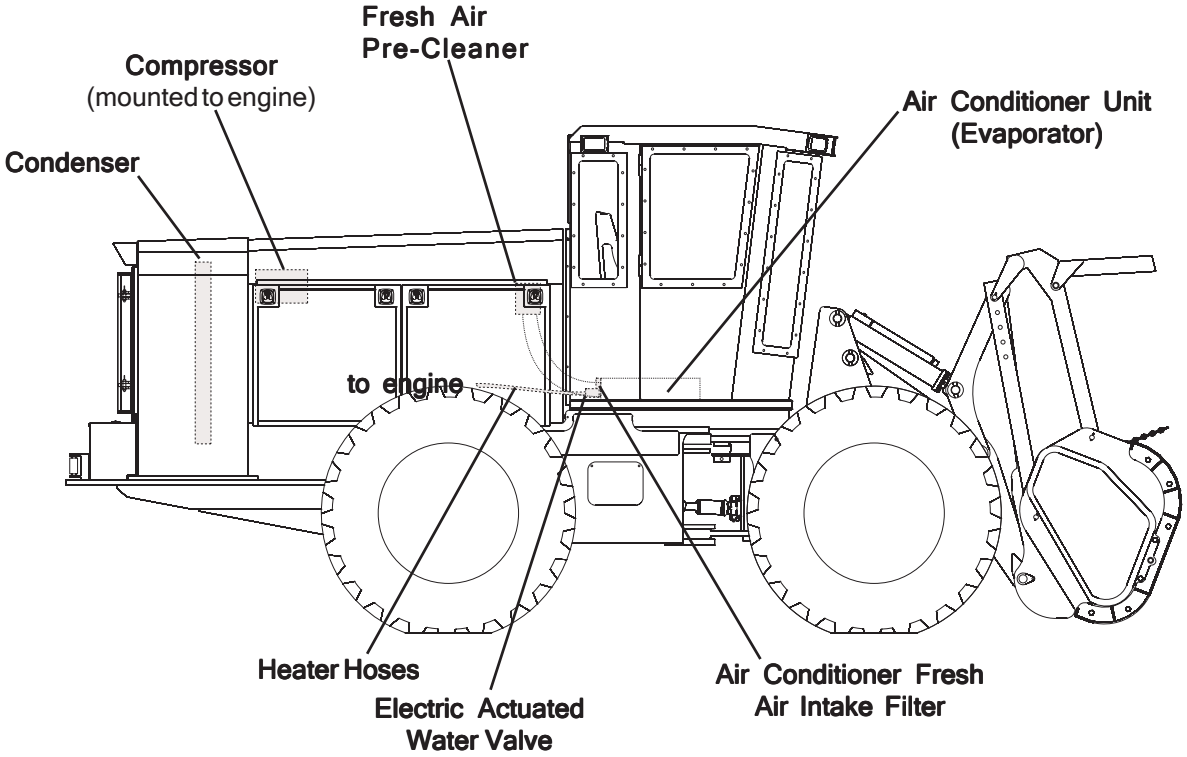
KEY TO CORRECT THE CAUSE
1. Alternator belt is loose or damaged. 2. Battery connections are dirty of loose. 3. Battery is damaged. 4. The ground connection is not making a good contact. 5. The alternator is damaged. 6. The engine is locked. 7. The starter has damage. 8. The wiring or the solenoid is damaged.

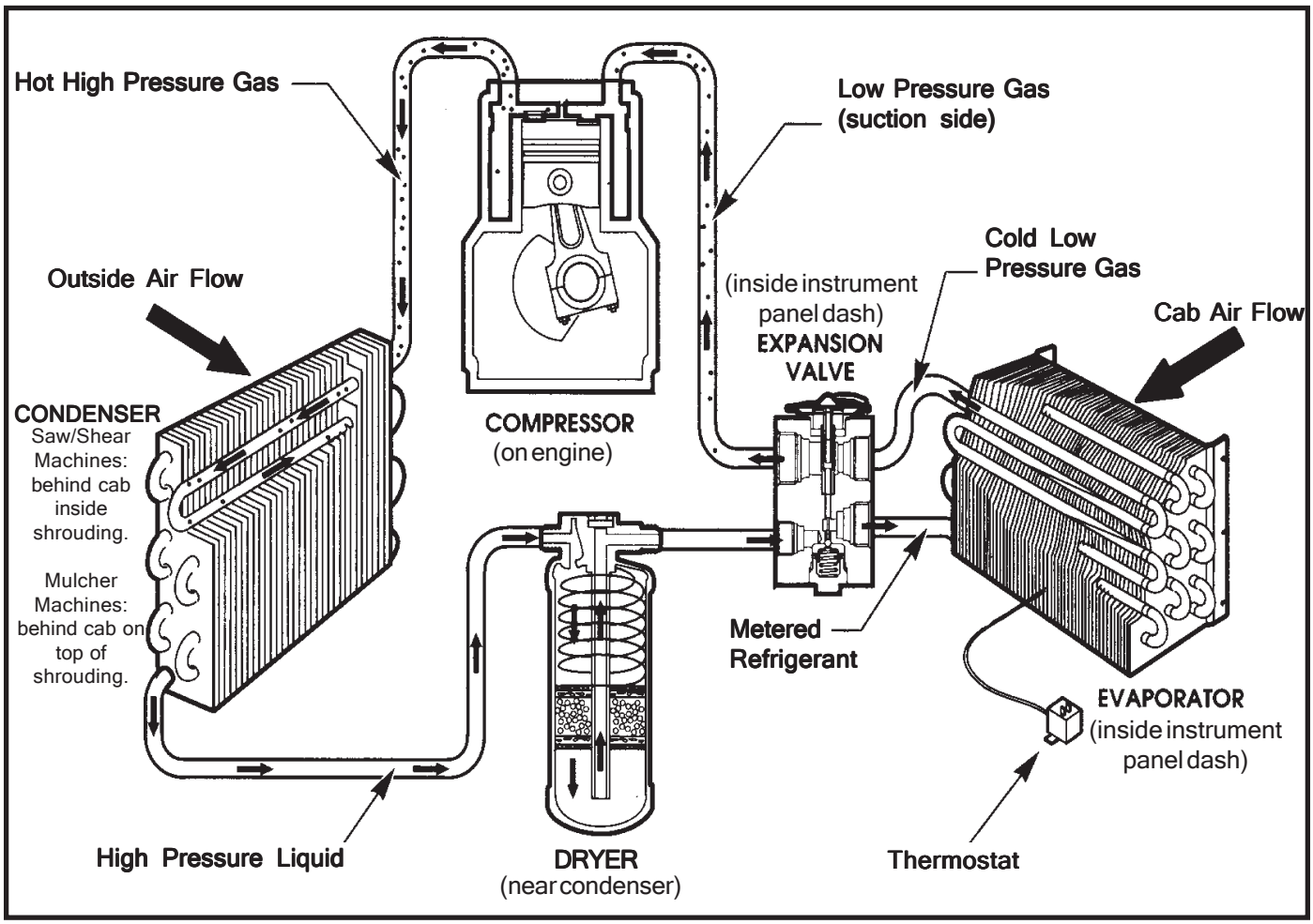
AIR CONDITIONER SYSTEM LAYOUT



⚠ CAUTION

Charge the 930-937 Mulcher Air Conditioner system with R134a refrigerant. An overcharged system may cause damage to the compressor.





Air Conditioner components are shown above connected together to illustrate system operation. The components shown are not to scale. The refrigerant and refrigerant oil are clear in color and not visible in this drawing. The small arrows inside the components and connecting hoses show the direction of refrigerant flow. The location of each component is in parenthesis.

Allow only certified personnel to service and maintain the air conditioning system. The Clean Air Act of 1992 states that anyone who works on air conditioning systems must be certified as proof of their training. Organizations such as the Mobile Air Conditioning Society (MACS) and the National Institute for Automotive Service Excellence (ASE) are approved by the Environmental Protection Agency (EPA) as organizations with approved independent testing and certification programs. Contact your local EPA office for more information.

REFRIGERANT

Always use refrigerant R134a in this equipment.

⚠ WARNING

Air conditioning systems operate under extreme high pressure. The containers refrigerants are sold in are also under pressure. When released into the air, a refrigerant boils away and becomes a gas. Its temperature drops INSTANTLY. Improper handling can cause frostbite and eye damage. If it spills on your skin or in your eyes, flood the area with cool water and SEEK MEDICAL ATTENTION IMMEDIATELY. Breathing refrigerant gas can result in respiratory problems, especially for people with cardiovascular disease.

Always wear safety goggles or a face shield and allow adequate ventilation when working with refrigerant

CHECKING/ADDING REFRIGERANT

Allow only certified personnel to service the heater/air conditioner system.

For Barko 930-937 Mulcher, 1 lb.-14 oz. of refrigerant is required for the system to operate properly.

⚠ CAUTION

Charge the 930 Mulcher Air Conditioner system with 1 lb - 14 oz. of R134a refrigerant. An overcharged system may cause damage to the compressor.

⚠ WARNING

Older air conditioning equipment may contain R-12, a substance which harms public health and environment by destroying ozone in the upper atmosphere. To remove R-12 from the air conditioning system, use service equipment certified to meet the requirements of S.A.E. J2209 or J1990.

RUNNING THE UNIT AS PREVENTIVE MAINTENANCE

Run the air conditioner for a while every two weeks or so even in cold weather. If the unit is unused for long periods of time, seals shrink and components become stiff. Running the unit is an easily performed procedure which can help prevent future problems.

FRESH-AIR INTAKE FILTER

This filter is located inside the instrument panel at the front (see diagrams on first pages of Air Conditioner Maintenance) and allows the air conditioner unit to draw fresh air from outside the cab for circulation.

On mulcher machines, change the filter as often as needed to ensure normal operation of the filter. This will be more often than for saw/shear machines because of the dusty work environment of the filter during mulching. See also Fresh-air Intake Filter Cleanout Fan information below.

To change the filter, remove the cover and replace the old one with a new one. This is a disposable filter and should not be cleaned and reused.

FRESH-AIR INTAKE FILTER CLEANOUT FAN (MULCHERS)

This fan is located in front of the fresh air intake filter and is used to purge the filter of dust/debris and clean it out. The switch to activate this fan is located on the instrument panel, however the air conditioner fan must be turned OFF before turning the cleanout fan on. The cleanout fan pulls air back through the filter to purge it and will not work properly if the air conditioner fan is turned on.

Periodically throughout mulcher operation, turn off the air conditioner and turn on the cleanout fan to purge the fresh air intake filter of dust and debris. This does not eliminate the need for filter replacement (which, on mulchers, must occur on a regular basis) but helps to keep the fresh air intake filter from being continually plugged.

RECEIVER/DRYER INSTALLATION

When installing/replacing the receiver/dryer, always install it in a vertical position (with sight glass and fittings at the top) in order for the heater/air conditioner to work properly.

CONDENSER INSTALLATION

The condenser must be installed with the ports at the top. Installing the condenser with the ports at the bottom will flood the compressor with coolant and ruin it.

AIR CONDITIONER TROUBLE SHOOTING

To display diagnostics depress the ON key three times. The digital display will then display any active fault codes. Pressing the ON again will scroll through any existing error codes.

Fault Codes:

No Faults ..... Displayed ! E00
Cab Sensor Shorted ..... Displayed ! E01
Cab Sensor Open ..... Displayed ! E02
Evaporator Probe Shorted ..... Displayed ! E03
Evaporator Probe Open ..... Displayed ! E04
Outlet Sensor Shorted ..... ERROR = E05 (not used)
Outlet Sensor Open ..... ERROR = E06 (not used)
Ambient Sensor Shorted ..... ERROR = E07 (not used)
Ambient Sensor Open ..... ERROR = E08 (not used)
Water Valve Shorted ..... Displayed ! E09
Water Valve Open ..... Displayed ! E10
Low Voltage ..... Displayed !E17
Communications to Panel from ECU ..... Displayed !E17

Additional Troubleshooting:

No Display
• Turn on Control Panel with the ON key.
• Check to see if the display illuminates.
• Verify that the Control Panel is plugged into the wire harness.
• Check to see if wire harness is wired into vehicle properly.

Problem: Control Panel Not Working or Nothing Works
Control Panel
1. If the control panel shows a display when turned on, the control panel is getting power. 2. Disconnect one of the sensors (Cab temperature or evaporator probe) or unplug the water valve. Press the ON key three times to enter the error checking mode. The appropriate error code should be displayed. If error code is displayed, control to ECU is making connection. If not, check wire harness connections, power to the ECU module, or replace the control panel.
3. If only certain functions do not seem to work on the control panel, inspect the keypad tail for being pinched. If connector tail is pinched and/or keys do not work, replace control panel key pad. SEE PHOTOS (Arrow pointing to connector tail)

Problem: Setpoint Temperature Not Maintained Properly
Cab Temperature Sensor (4-pin white connector)
1. Verify that the fan is spinning. Check for dust or debris and clean with "dust off" if necessary. Clean connector plug.
2. Voltage between Red and Black wires should be close to the vehicle voltage (12V or 24V).
3. Voltage between the two yellow wires should be between 0 and 5 volts (5V when the sensor is not connected).
4. Resistance across gray wires (Sensor unplugged). SEE CHART

Problem: Evaporator Core Icing Up (Freezing Up)
Evaporator Probe (2-pin black connector)
1. Set the control temperature to a low value. Verify that the compressor is on. Pull the probe and place is in a bath of ice water. Compressor should turn off. If not, bump up the control temperature a few degrees and try again.
2. Voltage between the two brown wires should be between 0 and 5 volts (5V when the sensor is not connected).
3. Resistance of evaporator probe sensor (Sensor unplugged). SEE CHART
4. If the probe functions properly but the core still freezes, reposition the tip of the probe to the coldest part of the evaporator core.

Problem: No Heat Control (Make sure air temp sensor checks out – see above "Cab Temperature Sensor")
Water Valve (6-pin connector)
The water valve can be prone to jamming if the coolant loop has excessive contaminants in it. If the valve must be replaced due to grit or debris preventing operation, flush the cooling system before replacing.
1. Checking water valve – with plug disconnected, apply 12 or 24 volts between pins 4 and 6 on the valve (the empty cavity is between pins 4 and 6). The valve should move in one direction. Reverse voltage and the valve should move in the opposite direction.
2. Check the wiring for good contacts.
3. The voltage between the orange and black wires (pins 6 and 4) should be + or – 12 or 24 volts depending on if the valve is opening or closing. If the valve is not moving, the voltage will be at 0.
4. The voltage between the yellow and green wires (pins 2 and 3) should be 5 volts.
5. The voltage between the purple and green wires (pins 1 and 3) should be between 0 and 5 volts (5V when valve is not connected).
6. If valve does not operate, replace valve. If power is not correct, check ECU.

Problem: No A/C
Clutch Power
1. If A/C clutch does not engage, check the red power wire to clutch relay.
2. Check clutch relay for engagement. Set the temperature control to a HIGH value and turn the defrost DEF button on. The relay should engage. Turn the defrost button off and the relay should disengage. (Note: there may be a few seconds of delay before engagement or disengagement).
3. The yellow wire to clutch relay grounds relay. Check that ECU is grounding yellow wire and relay operates. Manually ground yellow to test relay.

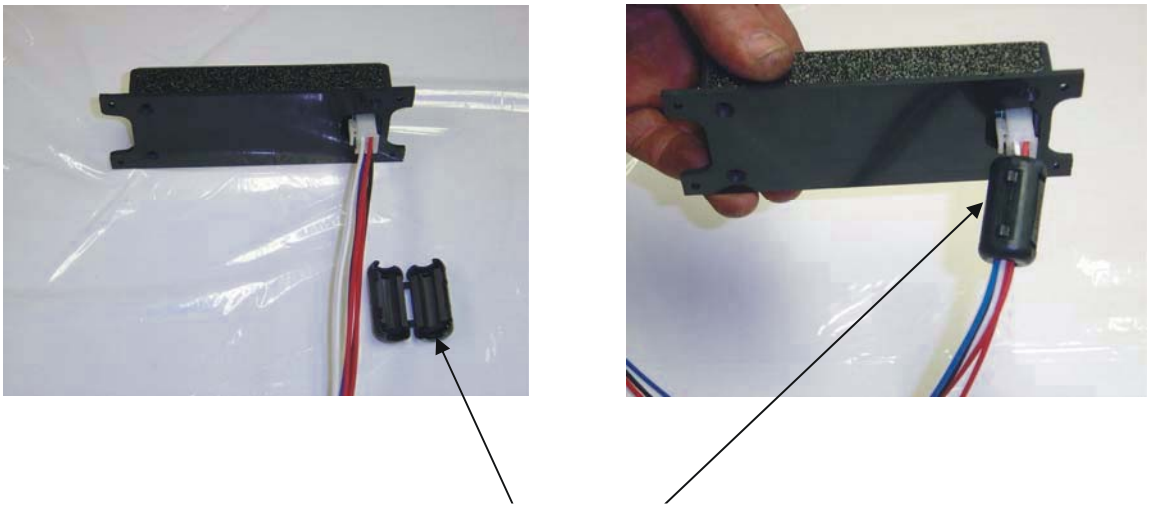
Problem: Blower Fan Not Turning On
Blower Fan

1. If everything else works but the blower fan does not turn on, check the wiring. If the wiring is found to be good, check for voltage on orange power wire to motor and check black ground wire for ground. If there is no voltage on orange power wire, replace ECU.
2. If power is on orange power wire to motor, motor should operate. Test motor with independent power and ground. If motor doesn't operate with independent power and ground, replace motor. If motor does operate with independent power, replace ECU.

ATC CONTROLLER
RFI INTERFERENCE

It has been discovered that the Programmable Control Panel may have some RFI interference that causes the panel to change programs. This does not happen on all units.

We have a choke RFI filter available. If your system does not have the choke filter, install the filter as shown in the photos below. Re-check the programming in the control head for proper programs.



RFI FILTER

INSTRUCTIONS FOR ADVANCED DIAGNOSTICS ATC SYSTEM AND PROGRAMMING

(Programming and Advanced Diagnostics Only on New StyleDiagnostics Only on Old Style)

Error code display is accessed by pressing the "ON" key three times quickly.

Press the "ON" key to cycle through all of the active error codes.
Wait five seconds to return to normal display mode.

The advanced diagnostics display mode is activated by pressing and holding the "ON" key for
five seconds while the error code is active.

Press the "ON" key to cycle through the following displays:
"CAb" Cab temperature display.
"EUAP" Evaporator temperature display.
"DUCt" Duct temperature display.
"HEAt" Water valve position (percent).
"A-C" A/C command (percent).
"FAn" Fan speed (percent).
Press the "OFF" key to return to normal display mode.

The firmware revision display mode is activated by pressing and holding the "ON" key for five
seconds while the advanced diagnostics display mode is active.

Press the "ON" key to cycle between the following displays:
"ECU" ECU module revision.
"CtrL" Control panel revision.
Press the "OFF" key to return to normal display mode.

The parameter function is activated by pressing and holding the "OFF" key for five seconds
while the advanced diagnostics display mode is active.

Press the "FAN UP/FAN DOWN" keys to select a config setting.
Press the "TEMP UP/TEMP DOWN" keys to change the selected setting
CFGF will globally set all 16 settings at once.
Press the "OFF" key to return to normal display mode.

Press the "TEMP UP" key and the "TEMP DOWN" keys simultaneously to change from Fahrenheit to Celsius.

24 pin connector pinout:

A1: Secondary Load Shedding input
A2: Evaporator Temperature Ground
A3: Evaporator Temperature Signal
A4: Cab Temperature Signal for all except 30K Thermistor
A5: Ambient Temperature Ground
A6: No Connection
A7: Water Valve Feedback +5VDC
A8: Water Valve Feedback Ground

A9: No Connection
A10: No Connection
A11: No Connection
A12: No Connection
B1: Cab Temperature Signal for 30K Thermistor
B2: Cab Temperature Ground
B3: Ambient Temperature Signal
B4: Water Valve Feedback Signal
B5: No Connection
11
B6: No Connection
B7: Serial + Connection to Control Panel
B8: Serial – Connection to Control Panel
B9: No Connection
B10: No Connection
B11: Water Valve Motor Positive
B12: Water Valve Motor Negative

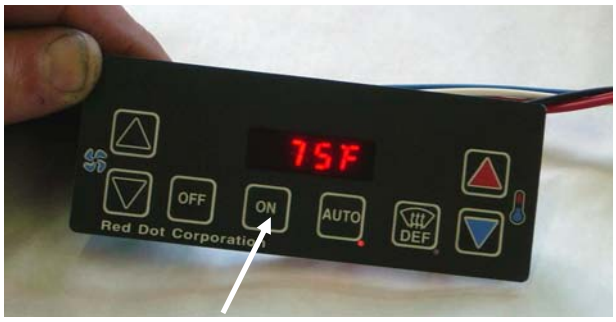
8 pin connector pinout:

A: Power In (12VDC)
B: Blower Output Positive
C: Blower Output Negative
D: Ground In
E: Pull to Ground for A/C Clutch Activation
F: Pull to ground when ON
G: Pull to Ground when Defrost
H: Pull to Ground when Heating

Configuration setting information:

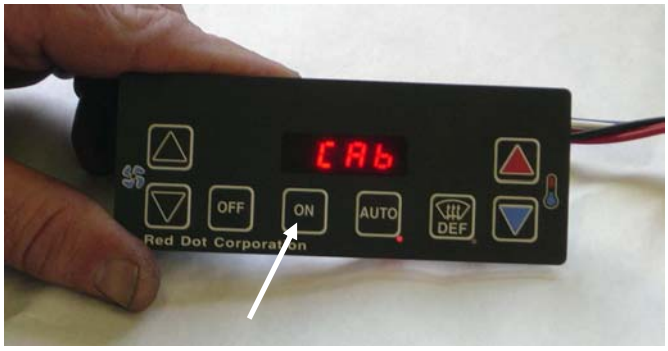
Cfg0 Defrost AC Function: 0(None), 1(Force On), 2(Force Off)
Cfg1 Econ Function: 0(Econ), 1(A/C), 2(None)
Cfg2 Use full blower in defrost mode: 1(Yes), 0(No)
Cfg3 Cab Sensor: 0(1.0K), 1(2.83K), 2(3.0K), 3(5.0K), 4(10K), 5(30K), 8(None)
Cfg4 Evap Sensor: 0(1.0K), 1(2.83K), 2(3.0K), 3(5.0K), 4(10K), 5(30K), 8(None)
Cfg5 Ambient Sensor: 0(1.0K), 1(2.83K), 2(3.0K), 3(5.0K), 4(10K), 5(30K), 8(None)
Cfg6 Duct Sensor: 0(1.0K), 1(2.83K), 2(3.0K), 3(5.0K), 4(10K), 5(30K), 8(None)
Cfg7 Load Shed: 0(None), 1(Vin), 2(Input#1), 3(Both)
Cfg8
Cfg9
CfgA
CfgB
CfgC
CfgD
CfgE
CfgF Configuration Set: 0(Custom)

Programming
1) Turn on.

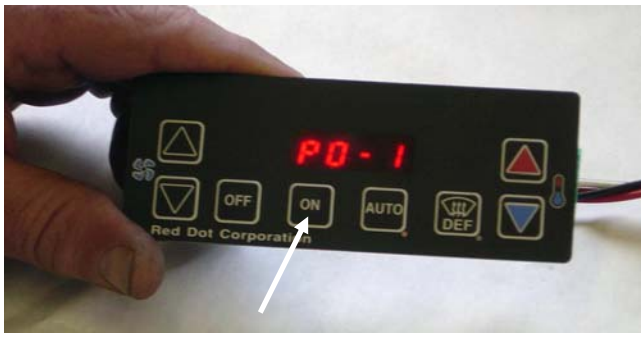


2) Error code display mode is accessed by pressing the “ON” key three times quickly.

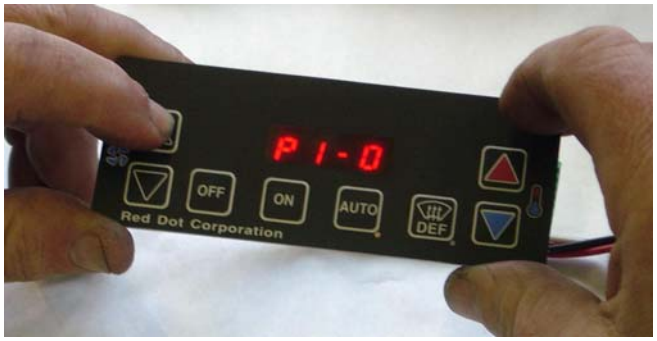
3) The advanced diagnostics display mode is activated by pressing and holding the “ON” key for five seconds while the error code display is active – CAb will display.



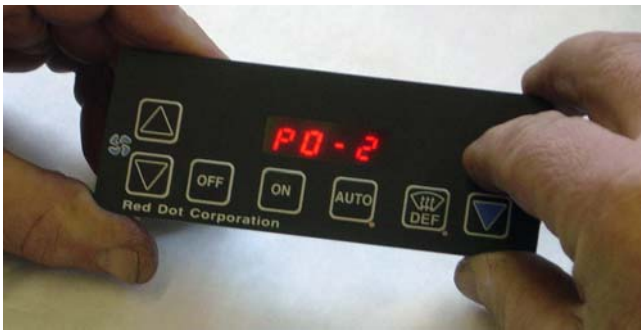
4) The parameter function is activated by pressing and holding the “OFF” key for five seconds while the advanced diagnostics display mode is active.

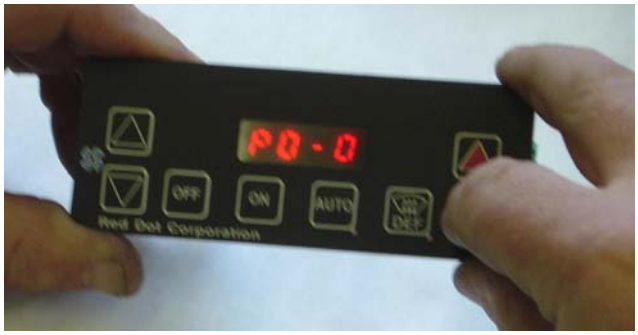


Press the “FAN UP”/”FAN DOWN” keys to select a config setting.



Press the “TEMP UP”/”TEMP DOWN” keys to change the selected setting.





Barko Programming

P0 - 1
P1 - 2
P2 - 1
P3 - 4
P4 - 3
P5 - 8
P6 - 8
P7 - 0
P8 - 0
P9 - 1
PA - 2
PB - 3
PC - 0
PD - 0
PE - 0
PF - 0

5) Turn off when done programming.

6) Check error code display by pressing the "on" key three times quickly
Should read "EQ"

D. POWER UNIT MAINTENANCE

ENGINE MAINTENANCE

The standard source of power for the hydraulic system in this machine is a Cummins 6C diesel engine. The John Deere engine is optional.

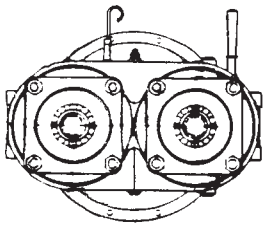
Complete specifications, operating instructions, and maintenance and lubrication information will be found in the Cummins or John Deere engine manual which accompanies the machine.

Either of these manuals may also include information on other, similar, engines. Be sure to use only the information which applies to the engine used on your machine.

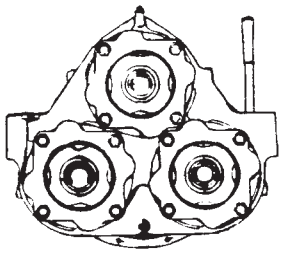
PUMP DRIVE MAINTENANCE

(FOR FUNK PUMP DRIVES)

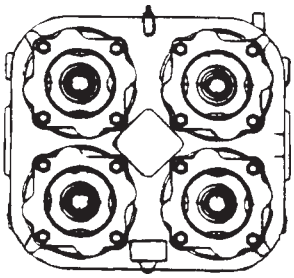
A. TWO, THREE AND FOUR PAD PUMP DRIVES



2 PAD PUMP DRIVE



3 PAD PUMP DRIVE



4 PAD PUMP DRIVE

Figure 1

LUBRICANT RECOMMENDATIONS AND FLUID CHANGING PROCEDURES

A. Lubricant Type:

EP 80-90 gear fluid (except for direct drive models).

B. Lubricant Grade:

Weather Temperature

Below -10 degrees F (-23 degrees C) = Use 75 W (Funk), Use 40W (Durst/Terrell).
Above -10 degrees F and up to 100 degrees F (37.8 degrees C) = Use 80 W/90.
Above 100 degrees F (37.8 degrees C) = Use 85 W/140.

C. Filling Capacities:

For Funk: until fluid comes back out of the fill hole. Do not overfill!
For Durst/Terrell (the following are approximate amounts - fill to level plugs or dipstick level only):
vertical mount: 1-1/2 quarts (1.42 Liters). Do not overfill!
horizontal mount: 4-1/2 quarts (4.23 Liters). Do not overfill!

⚠ CAUTION

Do not overfill. This will result in overheating and possible malfunction of the unit.

It is recommended that the fluid level be checked daily, at the same time checking for fluid leaks.
Because the lubricant system is the heart of the unit, it is especially important that the fluid be kept clean.

D. Checking/Changing/Adding Fluid:

1. Stop engine before checking or adding fluid.
2. Check unit for operational warning tags. Heed all warnings.
3. Clean around fluid fill before checking or adding fluid.
4. Change the fluid after every 400 hours of operation. Also, the fluid in the unit should be changed whenever the fluid level shows traces of dirt or effects of high temperature, evidenced by discoloration or strong odor.

5. Drain the fluid while the unit is still warm, examining for contamination or metal particles.

6. Clean all magnetic drain plugs before replacing.

7. Always use clean fluid in clean containers.

8. Fill with fluid - Do not overfill! (see B for temperature ratings, see C for capacities).

9. Maximum operating fluid temperature: 225 degrees F. (107.2 degrees C.)

WET SPLINE PUMP PADS

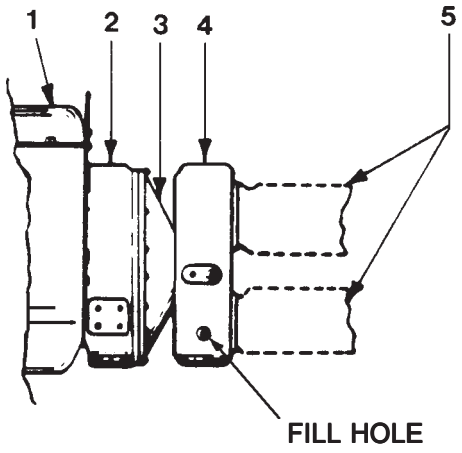
If your pump drive is a Terrell, it may have wet spline pump pads. Oil for lubrication of the splines is added through the oil caps in the top of the pump pads (the oil in the pump pad is kept separate from the oil inside the pump drive). Add the specified amount (see below) to each pump pad. Do not fill the pump pad completely full of oil:

C Pads 5 oz. of 80-90 gear fluid
D Pads 6 oz. of 80-90 gear fluid

PUMP DRIVE DISASSEMBLY

1. Drain fluid from pump drive gear box by removing Allen head pipe plug from bottom of main case.

2. Remove hydraulic pumps by removing capscrews, or nuts from studs. See Figure 2. Remove pumps straight away from pump drive.



1. ENGINE
2. FLYWHEEL COVER
3. ENGINE ADAPTOR
4. PUMP DRIVE
5. HYDRAULIC PUMPS

Figure 2

3. Remove pump drive from engine by removing capscrews, holding engine adaptor housing to flywheel cover of engine. Remove pump drive straight away from engine.

   a. Flex plate driven models:
      The drive shaft will remain with either the drive plate or the pump drive box. Be prepared to retrieve drive shaft from either.

4. Pump drive gear box should be positioned so that the hydraulic pump adaptor pads are facing up. Remove place bolts or nuts from studs and lift adaptor pads up from gear box.

5. Lift driven gears and their bearings from pump drive box. This can be done by hand since the bearings are slip fitted to the housing and pump adaptor bores. Bearings are press fitted to gear hubs. It may be necessary to tip gear slightly to clear pinion gear bearing pocket.

6. After all driven gears and their bearings have been removed, position gear box so that engine adaptor is facing up. Remove place bolts and lift engine adaptor up from gear box. Lift pinion gear and bearings from pump drive box.

7. Should replacement of oil seal be required, drive oil seal toward engine side of engine adaptor.

NOTE: Drive in direction of arrow.

8. To remove bearings from gear hubs, use gear puller or Arbor Press.

REASSEMBLY OF PUMP DRIVE

For reassembly, use the reverse procedure of 1 through 8.

NOTE: Plastic cord used for gasket material under pump adaptor plates and input housing is not reusable. Replace with new material when reassembling. See Figure 3 for installation of cord gasket. Place bolts should not be reused. Clean the old Locktite out of the bolt hole threads. Install new place bolts with Locktite 262, on the engine adaptor and pump pad. Place bolts are used in pump drive pad, torque studs to 150 ft. lbs..

Remove protective paper strip from cord and with adhesive side next to metal, install around pilot. Cross ends, as shown, behind bolt hole and let ends extend beyond flange. Use caution in assembly to case, to prevent gasket dislocation.

Do not attempt to reuse this gasket. For assembly use new gasket material.

On flywheel housings involving more than 4 bolt holes, be sure cord gasket lap joint falls behind one hole location which will be used for a bolt or stud fastener. Do not lap ends behind an unused bolt hole.

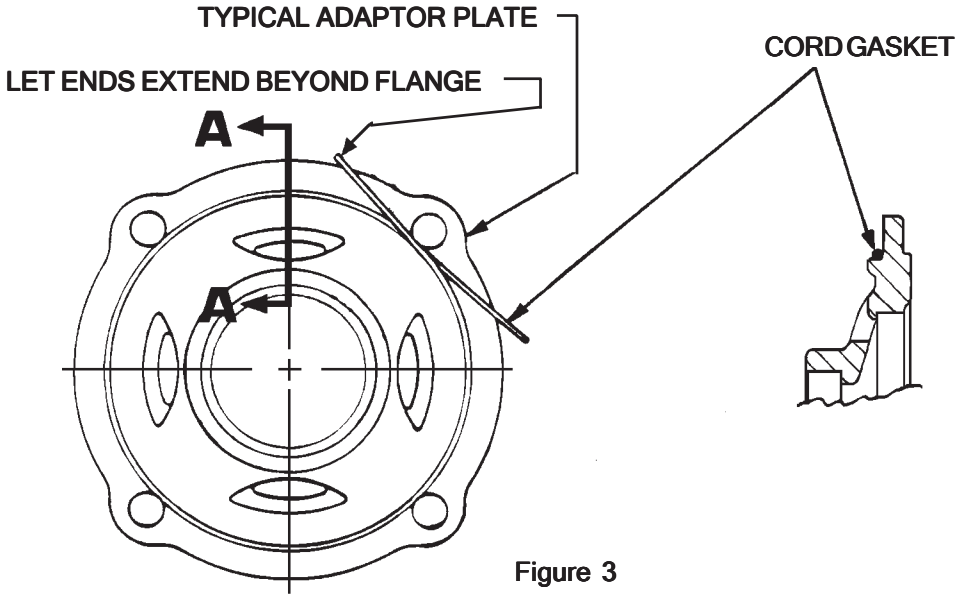


Figure 3

REPLACEMENT OF OIL SEAL

Install oil seal from engine side of engine adaptor. The rubber lip of the oil seal must point toward the inside of pump drive gear box.

NOTE: Drive in direction of arrow.

Drive Plate Models:

When installing drive plate on flywheel, be sure the long end of the drive plate hub is toward the engine. The hub should slide into the pilot bearing bore of the flywheel to ensure proper alignment of the drive hub and drive shaft.

NOTE: Arrow indicates engine side.

B. SINGLE PAD PUMP DRIVES

This type of Pump Drive (See Figure 4), is mounted to the engine, and is virtually maintenance free.

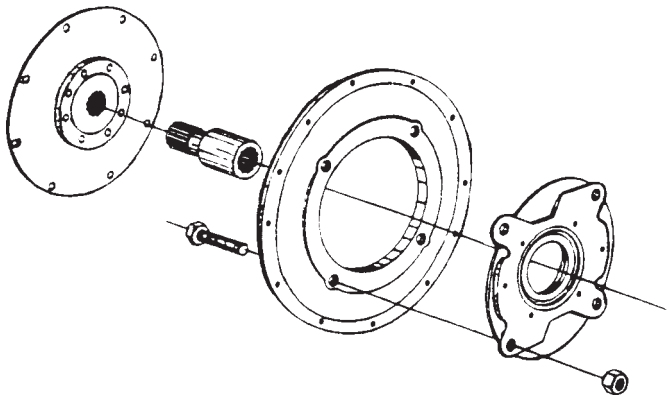


Figure 4

If a Disconnect Clutch (optional) is ordered on your machine, the following maintenance must be done.

C. OPTIONAL DISCONNECT CLUTCH

If clutch does not pull, heats, or operating lever jumps out, adjustment is required. To adjust clutch, remove hand hole plate, turn clutch until adjusting lock pin can be reached. Pull adjusting pin out and turn adjusting yoke to right or clockwise until operating lever requires a distinct pressure to engage. A new clutch requires several adjustments until friction discs are worn in. See Figure 5.

Example of a Pump Drive with a Disconnect Clutch

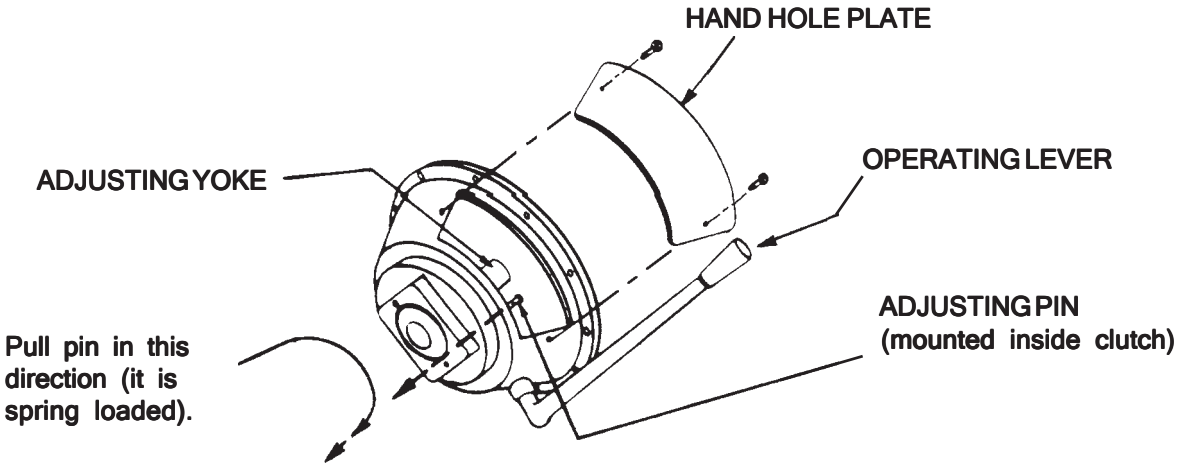


Figure 5

For cold weather start-up using Disconnect Clutch, see Start-up instructions in Operator's Manual.

AIR CLEANER MAINTENANCE

These recommendations have been developed by Barko to help you achieve maximum performance and life from the air intake system on your Barko built machine. However, Barko utilizes various engine manufacturers to meet the needs of our customers; in all cases the guidelines in the Operators Manual supplied by the engine manufacturer should supersede these recommendations!

Proper air cleaner servicing will result in maximum engine protection against the ravages of dust. Proper servicing can also save you time and money by increasing filter life and dust cleaning efficiency. Two of the most common servicing problems are:

1. Over-servicing: New filter elements increase in dust cleaning efficiency as dust builds up on the media. DON'T BE FOOLED by filter appearance, it should look dirty. By using proper filter restriction measurement tools you will use the full life of the filter at maximum efficiency.

2. Improper Servicing: Your engine is highly vulnerable to abrasive dust contaminants during the servicing process. THE MOST COMMON CAUSE OF ENGINE DAMAGE IS DUE TO CARELESS SERVICE PROCEDURES. By following the steps shown below and on the next few pages, you can avoid unnecessary dust contamination to the engine.

The following steps should be taken on a daily basis or more often in severe conditions:

1. Check to ensure that the air cleaner bonnet or pre-cleaner is free of leaves, twigs, etc. that are drawn in while the machine is working. (See Figure 1).

   NOTE: This is especially important in the fall months, as the trees shed their leaves.

2. Empty the pre-cleaner dust cup or vacuator. Frequency of this service will vary with dust conditions. See **Emptying The Dust Cup or Vacuator Valve.**
3. Check the restriction indicator daily. When indicated, change the element. See **Checking Air Cleaner Restriction.**

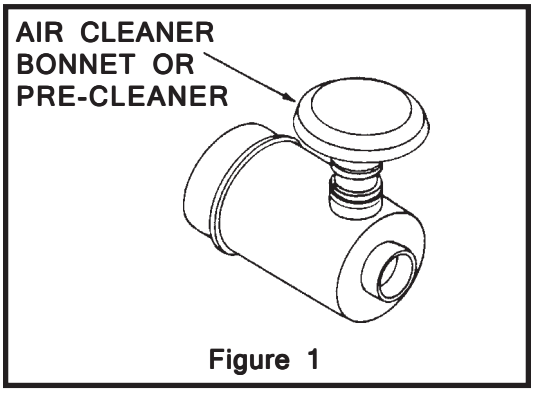


Figure 1

EMPTYING THE DUST CUP

Check the dust cup daily for dust build-up. When reinstalling the dust cup, make sure it seals 360 degrees around the air cleaner body and the directional arrows are pointed in the UP position. Dust cup does not need to be removed when the air cleaner is equiped with a vacuator (See following vacuator instrucitons). See Figure 2.

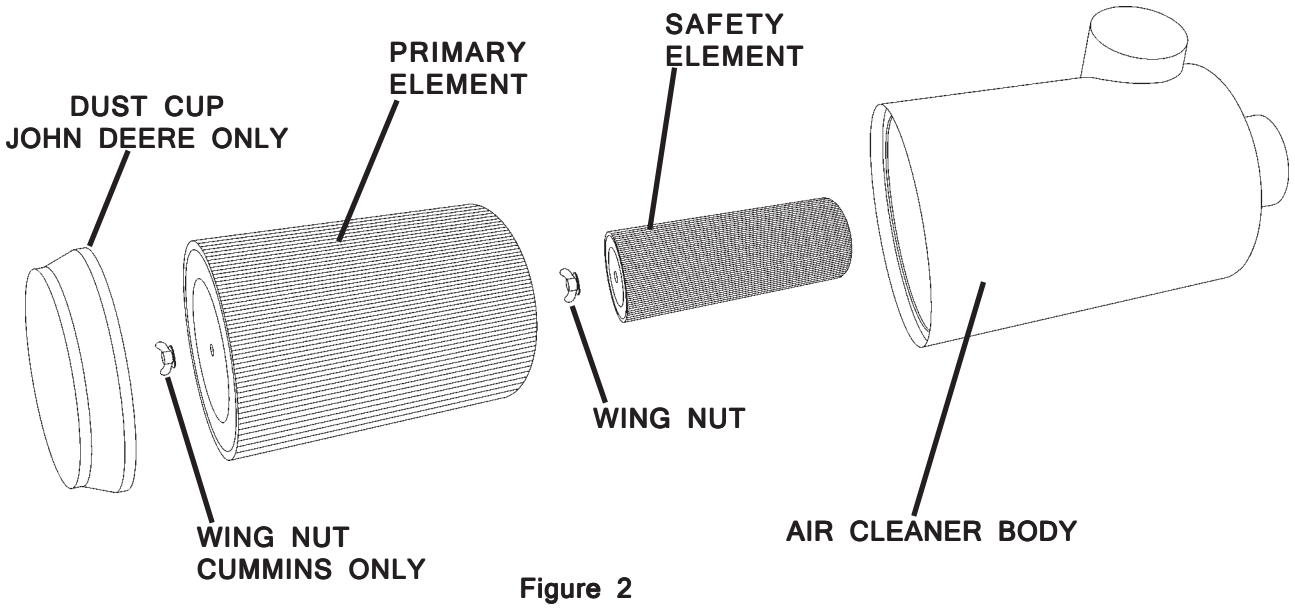


Figure 2

AIR CLEANERS WITH VACUATOR VALVE
On vacuator valve equipped models, (see figure 3) dust cup service is cut to a minimum. A quick check to see that the vacuator valve is not inverted, damaged, or plugged is all that is necessary.

Squeeze valve daily to keep open.

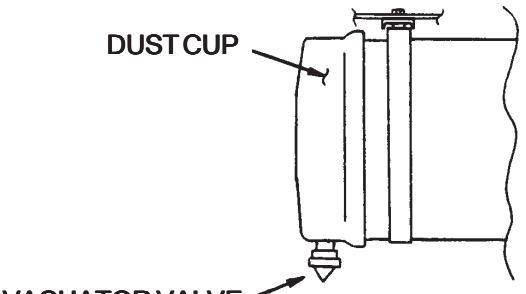


Figure 3

CHECKING AIR CLEANER RESTRICTION

Check the Air Cleaner Restriction Indicator daily for restriction. Restriction is caused by dust and dirt accumulating on the Air Cleaner Element. The method used to check the restriction will depend upon the type of Air Cleaner on the machine.

AIR CLEANERS WITH RESTRICTION INDICATORS
These air cleaners have a restriction indicator mounted to the Air Cleaner body (see Figure 4). The indicator plunger will be in the green zone when the Air Cleaner is empty - and will move up towards the red zone when the Air Cleaner is full of dust and dirt. When in the red zone, this means the Air Cleaner element needs to be replaced. See **Replacing The Air Cleaner Element** later on.

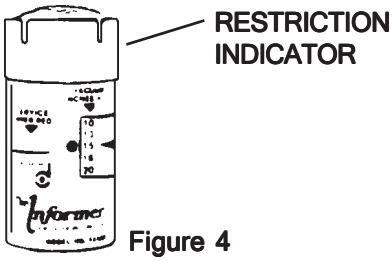


Figure 4

AIR CLEANERS WITHOUT RESTRICTION INDICATORS:
Measure the restriction of the Air Cleaner with a service gauge, or a water manometer at the restriction tap provided in the Air Cleaner, the transfer pipe, or the blower intake. Replace the element only when the restriction has reached the maximum allowed by the engine manufacturer. Contact the Barko Service Department for maximum values and any other questions concerning this method.

⚠ CAUTION
Check the Air Cleaner Assembly daily for cracks, loose clamps, or any other damage. If debris is able to bypass the Air Cleaner for any reason, it can damage the engine.

REPLACING THE AIR CLEANER ELEMENT

For minimum vehicle downtime, replace dirty air cleaner element with a new element. DO NOT CLEAN THE ELEMENT! DO NOT CLEAN THE ELEMENT WITH AN AIR HOSE! DO NOT SHAKE OR RAP ELEMENT! DO NOT RUN ENGINE WITHOUT AN ELEMENT! Do not leave air cleaner open to the environment longer than it takes to remove element, inspect and clean inside of air cleaner body, and install a new element.

When restriction indicates that element servicing is required, see the replacement steps on the next page.

SAFETY ELEMENT SERVICE (IF APPLICABLE)

The safety element is not intended to be cleaned.

For maximum engine protection and air cleaner service life, replace the safety element with a new safety element every third primary element change.

IMPORTANT STEPS TO FOLLOW EVERY TIME AN AIR CLEANER ELEMENT IS REPLACED:

1 REMOVE THE OLD ELEMENT AS GENTLY AS POSSIBLE

Loosen wing nut and remove old element. Baby that dirty element until you get it clear out of the housing. Accidentally bumping it while still inside means dropped dirt and dust that may contaminate the clean side of your filter housing, before the new filter element has a channce to do its job.

2 ALWAYS CLEAN THE INSIDE OF THE HOUSING CAREFULLY

Dirt left in the air cleaner housing spells death for your engine. Use a clean, damp cloth to wipe every surface clean. Check it visually to make sure it's clean before putting in a new element.

3 ALWAYS CLEAN THE GASKET SEALING SURFACES OF THE HOUSING

An improper gasket seal is one of the most common causes of engine contamination. Make sure that all hardenend dirt ridges are completely removed, both on the bottom and top of the cleaner.

4 CHECK FOR UNEVEN DIRT PATTERNS ON YOUR ELEMENT

Your old element is a valuable clue to dust leakage or gasket sealing problems. A pattern on the element clean side is a sign that the old element was not firmly sealed or that a dust leak exists. Make certain the cause of that leak is identified and rectified before replacing the element.

5 PRESS YOUR FRESH GASKET TO SEE IF IT SPRINGS BACK

Make sure your new element is made with a highly compressible gasket that springs right back when your finger pressure is released. A quality gasket is one of the most important parts of the element.

6 MAKE SURE THE GASKET IS SEATING EVENLY

If you don't feel the gasket is seating evenly for a perfect seal, you don't have protection. Recheck to see if the sealing surface in the housing is clean, or if the element is the correct model number. It may be too short for the housing.

7 REINSTALL DUST CUP

Be sure the dust cup seals 360 degrees around the air cleaner body and the directional arrows are pointing up.

8 CHECK CONNECTIONS & DUCTS FOR AIR TIGHT FIT

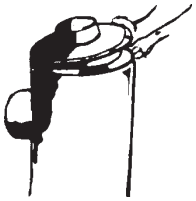
Check that all clamps and flange joints are tight, as well as cleaner mounting bolts. Seal any leaks immediately - they mean dirt is directly entering your engine. All duct joints, from air cleaner to engine, must be tight.

9 RESET THE RESTRICTION INDICATOR

If air cleaner is equipped with a restriction indicator, reset it to the green zone.

THE IMPORTANT "DON'TS" TO ALWAYS REMEMBER:

DON'T REMOVE ELEMENT FOR INPECTION



Such a check will always do more harm to your engine than good. Ridges of dirt on the gasket sealing surface can drop on the clean filter side when the gasket is released. Stick with the schedule. If you are on restriction maintenance, follow your reading or get a new indicator if you don't trust it.

NEVER RAP AN ELEMENT TO CLEAN IT. THIS WILL ONLY DESTROY IT.

Rapping hard enough to knock off dust often damages the element and destroys your engine protection. Deeply embedded dirt is never released by tapping. It's always safer to keep operating until you can change to a fresh filter.

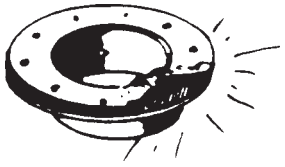
NEVER JUDGE YOUR ELEMENT'S LIFE BY LOOKING AT IT.

A dirty filter may still have plenty of life left, while carbon contamination is not visible to the eye. And you can't see the dirt that is embedded deep within the filter paper. Your best bet for lowest filter maintenance costs and best engine performance is to follow a restriction gauge. It's a smart, low-cost investment.

NEVER LEAVE AN AIR CLEANER OPEN LONGER THAN NECESSARY.

Your open air cleaner is a direct entry to your engine. If the element is not going to be changed and reassembled immediately, cover the opening. The only way to be sure nothing got in is to be sure nothing gets in.

DON'T OVERLOOK A WORN OR DAMAGED GASKET IN THE HOUSING

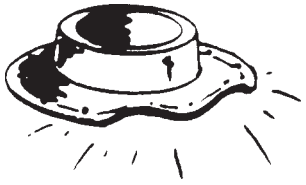


If your cleaner has a cover gasket, replace it with a new one. Always check to be sure no piece of the old gasket remains in the housing and that the gasket is not worn. If your filter model calls for a new gasket with each use, never reuse the old one.

DON'T USE A DENTED OR BUNCHED FILTER ELEMENT.

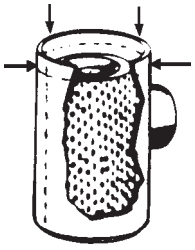
Never install a dented or punctured element, because it cannot protect properly against contamination. A dent can make a firm seal impossible or can indicate damaged media. An element with bunched pleats saps engine power and fuel dollars right from the start.

NEVER USE A WARPED COVER ON A HOUSING



Replace with a new cover as soon as possible. A warped or damaged cover cannot make a proper seal. Also check to make sure there is no damage to the air cleaner housing that could cause a leak.

NEVER SUBSTITIUTE AN INCORRECT ELEMENT MODEL NUMBER



Elements may look almost identical but can differ by a fraction of an inch in length - a difference that makes a firm seal impossible. You're always better off using the dirty element until you can get the correct model.

Machine Photos

NOTE

This section of the manual is used for the decal kits appropriate for the 930/937 Mulcher. Those kits are:

930 Base Kit (539-01064)
930 Cab Kit (539-01051)
930 Laminated Cab Kit (539-01062)
Mulcher Kit (539-01004)

If the decal kit information is missing from this section of your hard copy of this manual, contact your Barko dealer to obtain copies of the kits and insert them here.

If you are accessing this manual via Barko's Compact Disc (CD), the appropriate decal kits can be viewed under Decals on the Barko CD. They are listed by kit name.

Decals to be ordered separately (not included in any kit):

Part No.	Description/Location	Serial Number or Date of Change.	Qty.
539-01049	DECAL, "Barko" (on each side of shrouding) orange w/ brown shadow		2
539-01110	DECAL, "Barko" (on each side of shrouding) White w/charcoal border		2
539-01048	DECAL, "930" (on each side of shrouding) orange w/ brown border		2
539-0111	DECAL, "930" (on each side of shrouding) White w/charcoal		2
539-01122	DECAL, "937" (on each side of shrouding) White w/ charcoal border		2
539-00972	Striping, 6" orange/brown (on sides/rear of machine)		300"
283-00020	DECAL, Barko Strong Arm (on both tanks)		2
539-01115	DECAL, Barko Strong Arm (on both tanks) Charcoal w/clear backround		2
----	PLATE, serial number (on back side of front frame)		1

WARNING

Replace any safety decals that are faded, torn,missing, illegible, or otherwise damaged.

WARNING

Do not reproduce any decals listed or shown here for application on any Barko machine. The decals used on Barko equipment are designed to meet strict specifications for adhesion, temperature, color, layout and durability. Any unauthorized reproduction of these decals will void the machine warranty.

Contact your Barko dealer to order any kits you may need.